

DOCUMENT RESUME

ED 244 416

EC 162 411

TITLE A Resource Manual for the Development and Evaluation of Special Programs for Exceptional Students. Volume III-F: Electronic Communication Devices for Visually Impaired Students.

INSTITUTION Broward County Schools, Fort Lauderdale, Fla.

SPONS AGENCY Florida State Dept. of Education, Tallahassee. Bureau of Education for Exceptional Students.

PUB DATE 82

NOTE 179p.; The document was developed by Exceptional Student Education. For related documents, see ED 235 643, ED 235 652, and EC 162 404-420. Printed on colored paper, may not reproduce well.

PUB TYPE Guides - Non-Classroom Use (055)

EDRS PRICE MF01/PC08 Plus Postage.

DESCRIPTORS Braille; *Closed Circuit Television; *Communication Aids (for Disabled); *Electromechanical Aids; Elementary Secondary Education; *Speech Compression; State Curriculum Guides; *Visual Impairments

ABSTRACT

Part of a series on special education procedures in Florida, the manual presents information for teachers of visually impaired students regarding the use of electronic communication devices. Each of four types of devices is profiled: closed circuit television (CCTV), compressed speech devices, typewriter attachments for the Optacon (a device that converts print to tactile stimuli) and the Versabraille, (a paperless braille device). Each of the devices is analyzed in terms of a review of the literature, advantages and disadvantages, potential users, screening procedures, initial efforts, components, adjustments, operation, maintenance and warranties, and applications. Results of a survey completed by vision teachers, university personnel, and residential staff, are also included in each section. (CL)

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A RESOURCE MANUAL FOR THE DEVELOPMENT AND EVALUATION OF SPECIAL PROGRAMS FOR EXCEPTIONAL STUDENTS

VOLUME III-F

Electronic Communication Devices for Visually Impaired Students



State of Florida
Department of Education
Tallahassee, Florida
Ralph D. Turlington, Commissioner
Affirmative action/equal opportunity employer

This product was produced through a Special Project; Electronic Communication Devices for Visually Impaired Students, Title VI-B, Project number 81651, 423, funded by the Bureau of Education for Exceptional Students, Florida Department of Education, under Federal Assistance for the Education of the Handicapped (P.L. 91-230, EHA, Part B, as amended by P.L. 93-380 and P.L. 94-142).

This manual was developed by the Broward County Public School System, Dr. William McFatter, Superintendent, Fay Clark, Director/Exceptional Student Education, Nancy Lieberman, Curriculum Supervisor/Vision Impaired, under the guidance of Kit Kengott, Project Director.

This Resource Manual is one in a series of publications developed to assist Florida School districts in the provision of special programs for exceptional students. For additional information in this or other publications, contact the FDLRS clearinghouse/Information Center, Bureau of Education for Exceptional Students, Division of Public Schools, Florida Department of Education, Tallahassee, Florida 32301.

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Electronic Communication Devices for Visually Impaired Students is a Bureau of Education for Exceptional Students Special Project grant funded through EHA VI, Part B. This money is allocated for the support of special projects which will assist in meeting state-wide needs in the education of exceptional students.

The goal of this project was to develop a manual for training teachers of visually impaired students in the use of selected electronic communication devices in the following four areas:

- 1) listening skills using compressed speech devices,
- 2) standard print reading, writing and typewriting using closed circuit television systems,
- 3) print reading and typewriting using various Optacon lens modules,
- 4) braille reading and writing using the VersaBraille.

An audiovisual component, has been developed for the purpose of:

- 1) familiarizing parents, administrators, and regular educators with the use of the equipment in the classroom, and
- 2) demonstrating instructional techniques for use by teachers of visually impaired students.

Chapters include screening procedures, an operations and maintenance guide, instructional objectives, consumer information, glossary and annotated bibliography.

In January of 1981, questionnaires on the usage and awareness of each device were sent to the following: 106 vision teachers in the state of Florida, nationally 49 residential schools, 20 low vision clinics and 30 university training programs. The results of these questionnaires are included in each manual.

In the area of low vision aids, three different brands of closed circuit television systems (CCTV) were purchased: The Apollo Portareader, Pelco's LVA and Visualtek's RS-10 and Voyager. American Printing House Variable Speech Control Module and the VSC Speed Listening Adapter were the two compressed speech devices chosen. There were several reasons why these manufacturers were chosen: sales representatives from these companies were available to us, the companies responded to letters mailed initially requesting information and the Broward vision staff was most familiar with these particular models. Telesensory Systems, Inc. is the only company that produces the Optacon lens attachment for use with the typewriter.

The VersaBraille machine was chosen for several reasons. The cost of VersaBraille and availability of a sales representative in our area were variables in the decision making process. The VersaBraille also has many unique features. This device has a microcomputer control that allows the system to be set up like a book using chapters, pages, paragraphs, etc. to organize the material. This format is very helpful in the learning process, since the concept of the placement of the material is easier to grasp and understand.

During the summer of 1981, visually impaired students from all grades in Broward County participated in a special program focusing on the use of the devices. A total of twelve students enrolled in the summer program. The sessions were four hours a day, three days a week. The students ranged in grades from second through seventh. Three students used braille as their primary reading mode, the remainder of the students read large type, regular type, or a combination of both. Seven of the students were served by other exceptional programs; five in specific learning disabilities, one in an educable mentally retarded, one in gifted. Two of the low vision students had mild to moderate physical impairments.

Four of the low vision students had received previous instruction with the CCTV, two using the device on a regular basis. None of the Braille readers had been exposed to paperless braille; two had recently begun to receive Optacon instruction but neither were independent readers. All of the students had received instruction in listening skills but none had used a compressed speech device. Seven of the students, including the two braille readers had received some previous typing instruction.

The program was designed to assist in the development of screening instruments, provide experience with the appropriate device, and to increase the level of performance.

Assessment of the students during the first six sessions of the program provided information regarding reading and listening levels. The students were allowed to select the reading medium, i.e., large or standard type. Reading and typing rates were also obtained.

The two students who used the CCTV on a regular basis continued this use. Reading rates with the CCTV were consistently higher than rates obtained with standard or large type with or without the use of other low vision aids. The emphasis of instruction with these students was to increase reading rates, familiarize students with other models, provide experience with a variety of print formats, and improve handwriting legibility. The two other low vision students who had some experience with the CCTV also were physically impaired. No difference in performance with and without

the CCTV was noted for one student who could read standard type with a great deal of difficulty manipulating the x-y table and maintaining head control. The student consistently reported, however, that the magnification, brightness, and contrast afforded by the CCTV allowed him to better see the material. Because of the experience with this student, staff began to explore the possibility of a motor driven x-y table with alternative controls.

One of the braille reading students, acuity given as CF-1 (count fingers at 1 foot) used the CCTV for viewing of objects and print material, e.g., paper money and coins, photographs and drawings. At the end of the summer program the student was reading fifteen words per minute on the average using the CCTV.

The two other braille reading students received instruction in the use of the VersaBraille and Optacon. After approximately twenty-five, twenty minute sessions, the second and third grade students understood all the braille functions of the VersaBraille. Reading rates with the VersaBraille were approximately twenty percent slower than rates while reading paper braille. The students were able to search for and edit material.

One of the students had received previous instruction with the Optacon and could indentify upper and lower case sans serif and serif print. With the instructor tracking, the student could read approximately ten words per minute. Instruction during the summer session emphasized speed building exercises and independent tracking. The other student had received no previous instruction. At the conclusion of the summer program, the student could recognize twenty upper and lower case letters.

Seven of the students received typing instruction. Typing was deemed inappropriate for the two youngest students, one a braille reader and the other a low vision student. The two students with motor impairments did not receive typing instruction. Because of the lack of typing proficiency of the students, instruction emphasized beginning basic typing and electronic devices were not used.

This manual has been organized into five chapters. Within each chapter an electronic device is discussed and broken down into the following subheadings:

- Introduction
- Review of Literature
- Advantages/Disadvantages
- Potential Users
- Screening
- Components/Features
- Types

Operation
Teacher Hints
Consumer Chart
Maintenance
Warranty
Survey Results
Glossary
Annotated Bibliography
References

As parents, administrators, and regular education teachers become more aware of electronic devices and their potential as significant learning aids, the devices can be more readily accepted and incorporated into the classroom. As teachers of visually impaired students acquire expertise in providing instruction in the use of the devices, visually impaired students will have greater access to standard print, more efficiently utilize the auditory channel, and have more flexibility in the use of braille. Not only will visually impaired students be more efficient learners and thus more independent, but the time traditionally spent by teachers of the visually impaired in the preparation and instruction with special materials will be reduced.

We wish to acknowledge the assistance of the following persons:

The School Board of Broward County
Fort Lauderdale, Florida

Kit Kengott, Project Manager
Nancy Lieberman, Curriculum Supervisor
Bill Benchik, Program Monitor
Sandy Edmonds, Vision Teacher
Debbie Nelson, Vision Teacher

Bureau of Education of Exceptional Students
Tallahassee, Florida

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Center of Partially Sighted
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The School Board of Dade County
Hialeah, Florida

Dr. Peter Paraskeva
Supervisor for Programs of Visually Impaired/Autistic/
Physically Impaired

Division of Blind Services
Fort Lauderdale, Florida

Marilyn Chaiet, Rehabilitative Counselor
Debra Lieberman, Rehabilitative Counselor
Debra Marks, Rehabilitative Counselor
Margaret Foldberg, Rehabilitative Counselor

Equipment Manufacturers

American Printing House for the Blind
Arthur Curtis
Louisville, Kentucky

Apollo Lasers, Inc.
Jack Terry, Sales Representative
Delray, Florida
Douglas R Brent, Division Manager
Los Angeles, California

Pelco Industries, Inc.
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Gardena, California

Telensensory Systems

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VSC, Corporation

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Visualtek

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 Tampa, Florida
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 Fort Lauderdale, Florida
 Mimi Kaplan, Marketing Administrator
 Marc Stenzel, Director of Sales
 Santa Monica, California

Florida Instructional Material Center/Visually Handicapped

Suzanne Dalton, Resource Specialist

Talking Books Library

Jo Ann Block, Librarian
 Hollywood, Florida

Optometrist

Dr. John Renaldo, O.D.
 Fort Lauderdale, Florida

Carolyn Bacigalup, Optometric Assistant

The School Board of Palm Beach County

Cindy Mauri, Vision Teacher
 Mary Ann Hadman, Vision Teacher

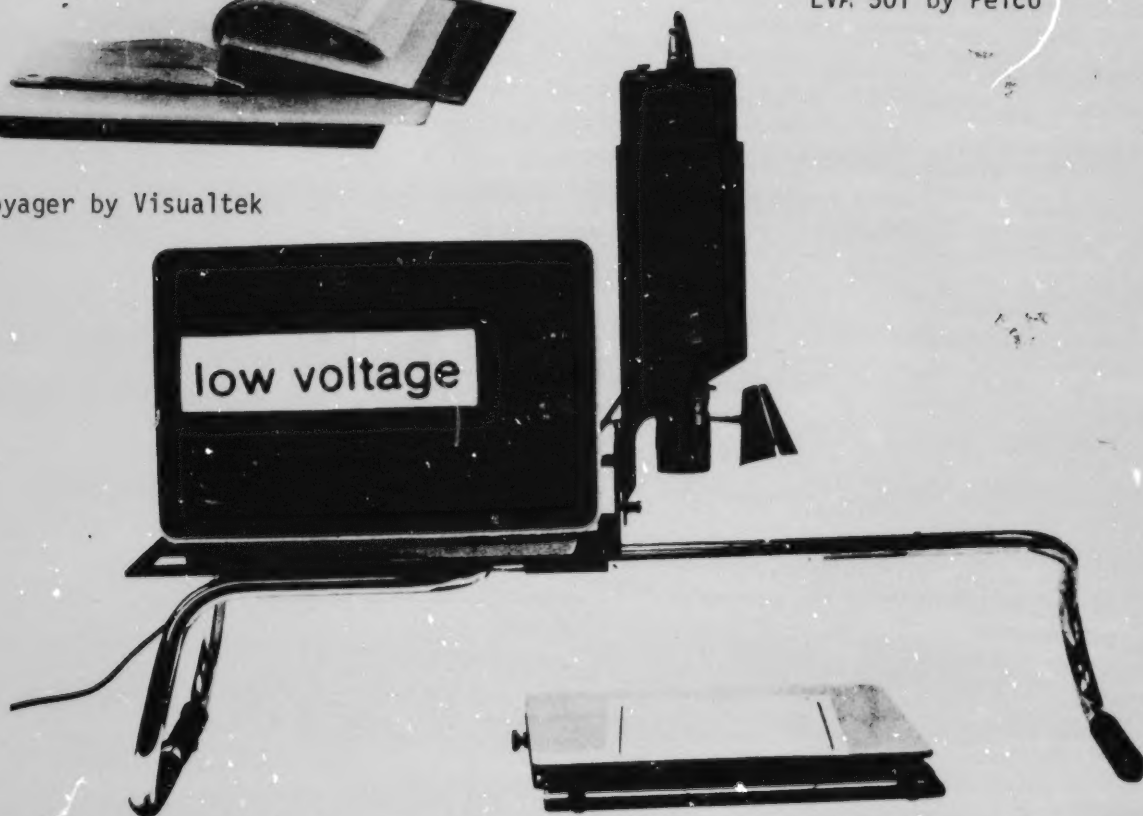
Figure 1
CLOSED CIRCUIT TELEVISION SYSTEMS
USED IN THIS PROJECT



Voyager by Visualtek



LVA 501 by Pelco



Portareader by Apollo Lasers, Inc.

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The CCTV system usually consists of a camera with a zoom lens and focus, set on a table stand with the camera pointed down. The camera can pick up the image of any printed material positioned beneath it and reproduces the image on the nearby television monitor. Since waves are not transmitted through the air, this system is termed a "closed circuit" television system. (Figure 2)

All the currently available CCTV models function in a similar manner. However, they differ in size, weight and physical appearance. For the sake of simplicity, they can be categorized into two groups: (1) those consisting of a separate camera and monitor, and (2) those with the monitor and camera in the same housing.

Factors affecting the image on the monitor include magnification, focus, contrast, brightness, and reversed polarity. These controls are standard features on most models. It is important that the controls are easy to locate and easy to use.

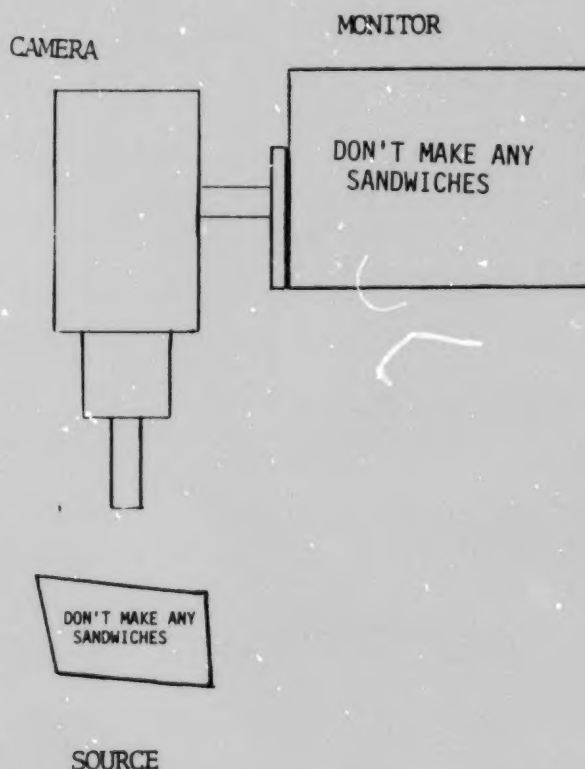


Figure 2. Closed Circuit Television System

The possibility of using a closed circuit television system (CCTV) as a low vision aid was first discussed by Potts, Bolk, and West in 1959. Genensky (1970) first described a practical model with his colleagues and continued to suggest modifications in design (Genensky, et. al., 1972).

In addition to the work of Genensky, a number of individuals: Israel (1973), Friedman (1973), Fonda and Hills (1974), Mintz (1975), Faye (1976), Sloan (1977) and Kraut (1979) have discussed the advantages and disadvantages of the system as a low vision aid and also presented case studies of both successful and unsuccessful users.

The versatility of the CCTV has been demonstrated by its use in a variety of educational situations. Adrian (1975) reported successful use of the CCTV in psycho-educational testing by administering the Bender Visual Motor Gestalt test for children, the performance scale of the Wechsler Intelligence Scale for Children, Rorschach Ink Blot Test, Thematic Apperception Test, Wide Range Achievement Test, and the Oral Gray Reading Test. Bikson and his colleagues (1979) reported significant gains on achievement test scores when the CCTV was used.

Faye (1976) stated that the CCTV is superior to other low vision aids for improving important school skills, such as writing, drawing, typing, and making diagrams. She described the CCTV as the only alternative for individuals with very low vision.

Stokes (1976) believed that braille is acceptable if touch is the only confirming sense. However, if sight can be used by viewing material on a television screen, this is preferable because the student is brought into direct contact with normally printed material. She further agreed that if print cannot be read without a CCTV then the system becomes an educational necessity.

LaGrow (1981) reported on six visually impaired high school students reading 10 point print with and without low vision aids, other than CCTV. After systematic instruction in the use of CCTV, there was an average increase of 81 words per minute for these six students.

The cost of the system is generally considered its major disadvantage. The cost effectiveness of the system increases when one considers the cost of production of large type books, not to mention the teacher time required to order or enlarge regular classroom materials (e.g., work sheets) (Rossi, 1980). Rossi also pointed out that less than ten percent of the books needed in New Jersey during the 1978-79 school year were available in large type on quota from the American Printing House for the Blind. The remaining titles were purchased from

other large type sources utilizing state funds.

While the educational implications of the CCTV are positive and promising and the cost effectiveness of the system over time may actually represent a savings when compared to the cost of acquiring or producing material in large type, little is available to the teacher of the visually impaired who wishes to teach the student how to efficiently use the system. Mintz recognized that the educational uses of the CCTV have not been explored sufficiently and that for low vision students the advantages of the system can negate the disadvantages. Faye (1976) noted that training is necessary for successful use but does not present a training program.

The CCTV component of this project addresses the educational uses of the CCTV and present considerations for training. Information is presented to assist school districts in determining potential users of CCTV's. Various models were compared to allow districts to match equipment capabilities with learner characteristics.

1. The CCTV magnifies ordinary reading copy including colored dittoed material.
2. A normal reading distance is possible. The student can sit comfortably and move the reading material by manipulating the X-Y table under the zoom lens. This permits a natural posture and minimizes fatigue.
3. The CCTV can be used binocularly regardless of the degree of magnification. The student is not required to use more than a normal amount of convergence for reading. (Faye, 1976)
4. The CCTV permits the use of a negative image in which the letters appear as white on a black background (reverse contrast or polarity). Many readers find this reversed contrast less fatiguing, and find it requires less magnification with the reversed image and provides greater field of view. (Sloan, 1977)
5. Diagrams, blueprints, and pictures can be scanned in their entirety, if the full field can fit on the screen. Mathematics, including geometry can be done more easily because the individual is better able to view the entire problem rather than individual parts. Orientation to the reading material is more realistic; the student sees that there are lines above and below the line being read without having to manipulate the material. (Faye, 1976; Stokes, 1976) The zoom lens permits rapid changes in magnification over a wide range. This feature is helpful when, for example, a diagram first needs to be seen as a whole before inspection of detail requires higher magnification. Available magnification is considerably higher than readily available with optical aides. (Sloan, 1977)
6. The CCTV is more efficient than other low vision optical aids for writing and typewriting. (Faye, 1976; Stokes, 1976)
7. The CCTV may be used for tasks combining reading and writing. (Sloan, 1977) Students can use workbooks.
8. Some CCTV models allow the student to focus the camera on more distant objects, such as, the chalkboard. (Faye, 1976)
9. Additional information can be accomplished by a closer than normal viewing distance, i.e., less than 16 inches. It is theoretically possible for anyone with measurable vision to read. (Faye, 1976)

10. There is less aberration than with optical aids. The contrast between image and background can be intensified. Brightness can also be adjusted. (Mintz, 1975)
11. It is aesthetically more desirable. The student looks less blind using the CCTV than using other magnifiers.
12. Visually impaired students tend to accept the use of a CCTV better than other low vision aids.
13. The major components, (the camera and monitor), need little attention. They can be expected to function without replacing parts for about five or six years.
14. The X-Y platform should not need any repair or replacement throughout the life of the CCTV system. Regular care involves periodic cleaning and lubrication. (Genensky, 1982)
15. If large print is the preferred reading medium, the CCTV can be used instead of large print materials.

1. It takes more time to become proficient in the use of a CCTV than is required for other optical reading aids. (Sloan, 1977; Faye, 1976)
2. The high cost of a CCTV system when compared to other optical reading aids. (Sloan, 1977; Faye, 1976; Stokes, 1976)
3. Several of the CCTV models are bulky, heavy, and not easily portable. Smaller optical aids are more flexible since they can be used at work, in school, at home, etc.
4. Maintenance of the several components of a CCTV system presents a greater problem than for other optical aids. (Sloan, 1977; Faye, 1976, Stokes, 1976)

Rebuttal of Disadvantages
by Dr. Samuel Genensky

1. The speed with which a person acquires the skill to use a visual aid concern is a functional one. The intelligence, dexterity and motivation of the user should be considered.
2. The so-called high cost of a CCTV is more myth than reality. When one takes into account the fact that with a CCTV system persons do not need specially prepared materials, readers, and other costly services, CCTV starts to look very cost effective.
3. Some of the users of CCTV's have CCTV systems at home as well as work. This is done by bringing all or part of the system home or by having more than one CCTV system.

Large type should not be used unless a thorough comparison with regular type is made. Comparison should include; reading comfort, silent and oral reading rates, number of miscalled words, comprehension, and the amount of material covered before fatigue becomes noticeable.

The disadvantages of large type include:

1. The total head-sweep is time consuming and tiring. The best reader of regular print misses lines and reads more slowly with large print.
2. Because of their large dimensions, the large type books do not fit into standard desks and lockers.
3. The weight and volume may make it difficult to carry and use an entire book. A one-volume text in standard print becomes a set of from two to as many as twenty volumes of large print.
4. The library selection of large type books is smaller than the number of books in braille. In addition, the materials tend to be out-of-date, since there is a waiting period necessary while texts are specially printed in large type.

Large type is used because it is available as special material and teachers and schools feel that they are "doing something for the blind." It is often more a matter of custom and an adult's perception of the value of large type. (Sloan, 1976) Selection of appropriate reading media should be based on comparison of reading . . . rather than availability of materials or custom.

Factors to be considered:

1. A person with a visual impairment of such severity that the strongest optical aid would not provide enough magnification for print reading. A person with vision less than 10/200 and as low as 2/200 may be potential CCTV reader. (Davis, Asarkof, Tallman)
2. Potential reading ability.
3. Inability to read regular print easily.
4. Gross and fine motor ability to operate controls and manipulate the X-Y table (i.e., good manual dexterity).
5. Students with standard pigmentary degeneration of the retina. (Sloan)
6. Students with photophobia or those who experience fading when they read with high intensity lamps. (Faye)
7. Students restricted in their reading distance and hampered by mechanical problems of illumination. (Faye)
8. Students with small central or peripheral fields. (Faye)
9. Anyone with some residual vision in the stronger eye (even 1/2 or 1 per cent) including people with peripheral or tunnel vision, glaucoma, cataracts, and retinitis pigmentosa. (Visualtek)
10. Vision that fluctuates or is very low.

Factors to consider in the development of the Individual Educational Program if the CCTV is to be recommended:

- students's reading ability
- student's preference
- CCTV screening results
- low vision examination results

These should be evaluated prior to recommendations for CCTV use.

CLOSED CIRCUIT TELEVISION

SCREENING

This screening may assist in determining the potential use of a CCTV as a low vision aid and to provide initial data to generate instructional goals and objectives for a particular student. Sections I, II, and III provide background information on present use of aids. It is important to know quantitatively as well as qualitatively how well the student is functioning without the CCTV. Section IV provides information regarding the student's ability to use the CCTV. Prior consultation with a low vision specialist familiar with the CCTV is advisable. Work with Division of Blind Services counselors to locate these specialists in your area.

STUDENT NAME _____ Attach Copy of Most Recent Eye Report

D.O.B. _____

SCHOOL _____ Grade _____

Reason for Referral: _____

Person Requesting Referral: _____

CCTV Used for Evaluation (Make/Model) _____

Evaluator: _____

Date (s) of Evaluation _____

The same factors that affect the reading efficiency of students with normal vision will contribute to the reading performance of visually impaired students with or without a low vision aid. Cognitive ability, language ability, motivation, and attentiveness are among the important characteristics to consider. Both fine and gross motor control are particularly important for efficient use of the CCTV. Any factors that may affect the reading performance of the student should be addressed.

Sections I, II, and III to be completed by vision teacher prior to CCTV evaluation.

Section I. Behavior or learning characteristics to considered:

Motivation to read: _____

Learning concepts: _____

Cognitive: _____

Other: _____

Current reading level is necessary information for examining and comparing the reading efficiency of the student. Data can be obtained from recently administered achievement tests or analysis of present reading material.

Section II. Current Reading Skills:

1. Reading Level

<u>Instrument</u>	<u>Date Administered</u>	<u>Score</u>
_____	_____	_____
_____	_____	_____

Comments: _____

Speed: _____

Comprehension: _____

Test Adaptations: _____

Other: _____

The student's use of prescription or non-prescription aids should be noted. Comments might include the student's reaction to and acceptance of the aid, how often and for what type of viewing, what type of material, etc. Include any previous experience the student may have had with a CCTV.

2. Low Vision Aids

- (a) If prescribed, does student use glasses or low vision aids?

yes _____ no _____

Comments: _____

Power/Magnification: _____

Reading Distance: _____

Illumination: _____

3. Reading Medium

_____ Standard Type (9-12 point, J5-J8, 1.0M-1.6M)

_____ Large Type (14 point or larger, J9 or larger, 2.M or larger)

_____ Braille

If two or more are checked, describe the conditions or circumstances when different media are used.

4. Reading Efficiency

(a) Describe any reading difficulties experienced by the student.

Fatigue: _____

Illumination: _____

Type styles: _____

Format: _____

Sub-sections b and c provide comparative and quantitative information regarding the student's oral reading efficiency with standard and large type. The material should be at a reading level below that indicated in Section II, 1., so that rate and comprehension are not overly influenced by vocabulary but are more a measure of the ability of the student to read the print size. A description of the material, including grade level, should be included in the comments. It is preferable to average three or more reading samples, each between three minutes and ten minutes long. Measure comprehension with five to ten questions. Individualized or remedial reading programs or alternate forms of standardized achievement tests might be utilized. (note difficulties)

(b) Standard Type (minimum 3 trials)
(9-12 point, J5-J8 or 1.0M-1.6M)

Viewing Distance _____ / _____ / _____

Reading Rate _____ / _____ / _____

Comprehension _____ / _____ / _____

Comments: _____

- (c) Large Type (minimum 3 trials)
(14 point or larger, J9 or larger, 2.0M or larger)

Viewing Distance: / /

Reading Rate: / /

Comprehension: / /

Comments: _____

Obtain a handwriting sample from the student and use teacher judgement as to the quality and note any difficulties exhibited by the student. Indicate any special writing needs required by the student, e.g. felt tip pen, bold line paper, etc.

Section III. Handwriting Sample: (attach)

Comments: _____

Section IV. Evaluation with CCTV:

Allow the student to view easy-to-read material with both positive and negative polarity. Ask the student to indicate his preference. The teacher should insure that the focus, contrast and brightness are set at optimal levels.

1. Preferred Polarity

_____ black letters on white _____ white letters on black

The linear magnification is found by dividing the height of the main body of the letters on the screen by the height of the main body of the print letters. The lowest possible linear magnification at the given distances should be recorded.

2. Linear Magnification

Viewing Distance

Linear Magnification

16"

12"

8"

Comments: _____

Center one line of a paragraph at the preferred viewing distance and linear magnification. The student is to track the print from left to right and return as quickly as possible and read only the first and last letter of each line. The teacher is to record the total time needed to track through ten lines of the paragraph and note each time the student loses the line, i.e., section of line in which half the letters are no longer visible on the screen. Any additional difficulties in tracking should be noted.

3. Tracking

Number of Line Losses _____

Time _____

Comments: _____

With the student manipulating the X-Y table and reading orally, note reading rates and comprehension. Measure the rate and comprehension at each viewing distance with the linear magnification preferred by the student.

4. Reading Efficiency (Minimum 3 trials with and without low vision aid)

16"	Rate _____	Comprehension _____
12"	Rate _____	Comprehension _____
8"	Rate _____	Comprehension _____
less than 8"	Rate _____	Comprehension _____

Comments: _____

Obtain a writing sample from the student while using the CCTV. This writing sample should be obtained while the student is viewing the monitor, not the paper on the X-Y table. Attach handwriting sample to screening form.

5. Handwriting Sample (attach)

Comments: _____

6. Does the student experience fatigue while using the CCTV? _____

7. Student's feelings about using the CCTV? _____

A recommendation regarding training with the CCTV should be based upon near acuity, reading efficiency with and without the CCTV, and any other variables that influence reading performance. Other educational activities that might be facilitated by use of the CCTV, e.g., handwriting, typing, viewing diagrams and charts, should also be considered. Whenever possible, a low vision specialist who is familiar with the CCTV should be consulted for an opinion on potential use or circumstances of use.

Recommendation: _____

Signature of Evaluator

Date

*Send copy of evaluation to his/her eye specialist and to appropriate school district personnel.

CLOSED CIRCUIT TELEVISION
SCREENING

STUDENT NAME _____ Attach Copy of Most
D.O.B. _____ Recent Eye Report
SCHOOL _____ GRADE _____

Reason for Referral: _____

Person Requesting Referral: _____

CCTV Used for Evaluation (Make/Model) _____

Evaluator: _____

Date(s) of Evaluation: _____

Sections I, II, and III to be completed by vision teacher prior to CCTV evaluation.

Section I. Behavior or learning characteristics:

Motivation to read: _____

Language concepts: _____

Cognitive: _____

Other: _____

Section II. Current Reading:

1. Reading Level

<u>Instrument</u>	<u>Date Administered</u>	<u>Score</u>
_____	_____	_____
_____	_____	_____

Comments: _____

Speed: _____

Comprehension: _____

Test Adaptations: _____

Other: _____

2. Low Vision Aids

(a) If prescribed, does student use glasses or low vision aids?

_____yes _____no

Comments: _____

Power/Magnification: _____

Reading Distance: _____

Illumination: _____

(b) Has student been exposed to non-prescription low vision aids?

Comments: _____

3. Reading Medium

_____ Standard Type (9-12 point, J5-J8, 1.0M-1.6M)

_____ Large Type (14 point or larger, J9 or larger, 2.0M or larger)

_____ Braille

If two or more are checked, describe the conditions or circumstances when different media are used.

4. Reading Efficiency

(a) Describe any reading difficulties experienced by the student.

Fatigue: _____

Illumination: _____

Type styles: _____

Format: _____

(b) Standard Type (minimum 3 trials)
(9-12 point, J5 - J8 or 1.0M - 1.6M)

Viewing Distance _____ / _____ / _____

Reading Rate _____ / _____ / _____

Comprehension _____ / _____ / _____

Comments: _____

- (c) Large Type (minimum 3 trials)
(14 point or larger, J9 or larger, 2.0 or larger)

Viewing Distance	_____	/	_____	/	_____
Reading Rate	_____	/	_____	/	_____
Comprehension	_____	/	_____	/	_____

Comments: _____

Section III. Handwriting Sample: (attach)

Comments: _____

Section IV. Evaluation with CCTV:

1. Preferred Polarity

_____ black letters on white _____ white letters on black

2. Linear Magnification

Viewing Distance	Linear Magnification
16"	_____
12"	_____
8"	_____

Comments: _____

3. Viewing Distance Linear Magnification Preferred by Student:

Viewing Distance _____ Linear Magnification _____

4. Tracking

Number of Line Losses _____

Time _____

Comments: _____

5. Reading Efficiency (minimum 3 trials)

16" Rate _____ Comprehension _____

12" Rate _____ Comprehension _____

8" Rate _____ Comprehension _____

less than 8" Rate _____ Comprehension _____

Comments: _____

6. Handwriting Sample (Attach)

7. Does the student experience fatigue while using the CCTV? _____

8. Student's feelings about using the CCTV? _____

Recommendation: _____

Signature of Evaluator

Date

The first step in teaching a student to use the CCTV is for you as a teacher to be familiar with, and feel comfortable with, the system.

It is important that the teacher always try the activity first to get a better understanding as to how the student will be able to see it.

COMPONENTS

The monitor, camera and X-Y table are components that the student needs to be instructed on.

1. Monitor: The screen size of the different models varies from 9 inches to 19 inches when measured diagonally.
2. Camera: With focusable lens.
3. X-Y Reading Table: Also called the X-Y platform. It slides from side to side and forward and backward. The reading material lies on the table and is moved from side to side to read a line of print and forward to read down a page.

1. Power Switch(es): Single and double switch models, the latter with separate switches on the monitor and the camera component.
2. Magnification (Zoom): Controls changes in the magnification. With the exception of the Voyager model, the magnification or zoom control is a ring type control located on the lens. The magnification is varied by turning the ring.
3. Brightness and Contrast Controls: Found on all monitors, allows the user to adjust the brightness and contrast for particular needs. The controls can make poor quality copy clearer and can compensate for the user who has difficulty reading when lighting is not appropriate.
4. Aperture (depth of focus): Regulates the amount of light entering the lens. More light will mean a brighter picture but with reduced contrast. Usually located at the base of the lens.
5. Polarity (Reverse Contrast): Allows for the selection of a dark image on a light background (positive image) or light image on a dark background (negative image). Location of the switch varies with different models.
6. Focus: Ring type control located on the lens. With most models, the image can be focused at maximum magnification and then remains in focus when the magnification is reduced.
7. Image Reverse: Control usually located on the camera component. Mirror accessory allows the user to read material in a typewriter.
8. Line Marker(s): Allows the user to restrict the amount of material visible on the monitor by blanking out unneeded portions. Generally, there are two, one that adjusts the image restriction from the top of the monitor down and the other from the bottom up. Location of the controls varies but usually is found on the lens.
9. Margin Stops on X-Y Table: Limits the movement of the viewing table and functions in a manner similar to the margin set on a typewriter. Located on the front of the X-Y table, the left margin stop fixes the right margin, the right margin stop fixes the left margin. Most models have a brake that impedes movement in the y direction. Margin stops and brake should be adjusted and tightened by hand only.

1. The teacher should know the capabilities and limitations of the CCTV, know how to operate controls, how to trouble shoot and maintain the unit.
2. The teacher should encourage the students to use the lowest magnification possible. This results in less movement of the X-Y table.
3. The student and his classmates should understand that the CCTV is a learning aid and not a toy. It may be helpful to allow classmates the opportunity to briefly work with the CCTV in order to satisfy their curiosity.
4. The lamp on some models should be positioned to reduce direct glare or reflected light.
5. Do not leave a stationary image on the screen for an extended period of time; doing so will leave a "ghost" image on the screen. If a ghost image is on the screen, place a sheet of white paper under the lens for a few minutes. This will clear the screen.
6. If an extension cord is necessary, use a heavy duty cord.
7. The monitor should be level with the student's line of sight. Tilt stands are available with some models.
8. The teacher should encourage the student to sit properly, adjustable chairs may help.
9. The support table for the CCTV should provide adequate leg room.
10. The teacher should encourage the student to adjust the brightness and contrast to providing for the clearest image.
11. If vandalism or theft are concerns, the following should be considered:
 - (a) The camera unit can be removed and secured.
 - (b) If the system is portable, it can be placed in a storeroom or closet.
 - (c) Locks, installed at the factory, can be purchased which prevents the unit from being operated. Lens locks can also be obtained (Visualtek, Apollo).
12. Retain all packaging so that the CCTV can be returned to the manufacturer for servicing if necessary.

13. Location within room should be considered.
14. Train the student to check that machine is plugged in, and show him how to plug it in if it is not.
15. Plexiglass sheets can be cleaned with spray glass cleaner.

1. It is best to begin with reading material from the student's independent reading level, as the first sessions are designed to familiarize the user with the system. For non-readers or braille readers, use letters, numbers, or figure worksheets. It is important that a good print copy is used.
2. Place the reading material in the center of the x-y table. Show the student how to position material on the table so that the printed material appears straight on the screen.
3. Some students find that reading is more efficient while using the reverse polarity. Contrast and brightness should be adjusted for the maximum dark background.
4. Adjust the zoom for minimum magnification and scan the page to get an overall idea of the format of the material.
5. Line the zoom for maximum magnification and adjust the focus until the image is the sharpest. Reduce the magnification until the magnification is at the lowest level while still allowing comfortable reading.
6. Set the adjustable margin stops to limit the left and right movement of the x-y table. If the length of the printed lines is fairly constant, demonstrate to the student how to set the margins, using the end of line for a guide. As a line is finished, instruct the student to move the entire table back to the right while staying on the same line. When the left margin of the material is again under the camera, move the table back slightly bringing another line of print onto the center of the screen.
7. If the material cannot lie flat on the x-y table, i.e., when using a thick book, place another book under the side that has the least number of pages. Clear plexiglass sheets are available to flatten down many materials.
8. Different shades and colors of overlays will affect the required adjustments for contrast and brightness.
9. If greater magnification than what the model is designed to provide is required, reading material can be elevated on the x-y table to result in increased magnification.

1. A positive image (black on white) is best for writing.
2. Reduced magnification, i.e., less than normally used for reading, may be necessary for writing.
3. When first learning to write the student should use a black medium-to-fine point pen.
4. The student should learn to watch the screen rather than his hand.
5. When beginning to write, place the point of the pen or pencil on the paper under the lens in order to adjust the focus for a clear image.
6. The student may have to adjust his normal hand grip for best results, i.e., shorten the grip on the pen or pencil holding it closer to the point.
7. Ideally the x-y table should not be locked in place but should be allowed to move. However some students may need the table locked initially.
8. The same materials and techniques used to teach cursive writing can be employed.
9. As the student becomes proficient, have him use a ball point pen. Most pencils make lines that are light and more difficult to read. If a pencil is necessary, e.g., marking test answer sheets, a #2, soft lead pencil is adequate.
10. Do not leave writing paper on the screen for an extended period of time. Turn the machine off when it is not being used.

1. It is important to select a typewriter that produces clear, distinct letters.
2. Most portable typewriters can be used.
3. Various CCTV models accept typewriters in different ways. Instructions for preparing to type with individual models follows:

A. Apollo PortaReader

- I. Slide the typewriter under the PortaReader.
- II. Line up the typewriter with the lens.
- III. Loosen the wing nut, grasp the top of the camera and rotate it back toward the front until the camera is angled and pointed at the carriage of the typewriter. Tighten the wing nut.
- IV. Adjust the lamp to illuminate the typewriter. Focus and adjust the controls for the best image.

B. Pelco

- I. Remove the scanning table by loosening the four table lock nuts, two on each side of the unit.
- II. Place the typewriter on the flat surface under the camera.
- III. Center and align the typewriter.
- IV. Screw in the typewriter mirror in a clockwise direction.
- V. Adjust the zoom lens for minimum magnification.
- VI. Adjust the focus.
- VII. Move the typewriter so the platen is centered on the screen.
- VIII. Engage image reverse control and adjust aperture if necessary.

C. Visualtek

- I. Be sure the Voyager is raised to the maximum possible height on its legs.

- II. Lock the x-y table in place. If a larger typewriter is used, the x-y table can be removed and the typewriter can rest on the table surface.
- III. Place the typewriter under the Voyager. There must be at least 10 cm clearance between the top of the typewriter and the bottom of the Voyager. If there is not enough clearance, a two camera system may be necessary, or special mounting legs may be secured.
- IV. Engage the TA switch (image reverse) on the front panel.
- V. A number of adjustments may be required such as the position of the typewriter (forward or back), the angle of the mirror, and the zoom and focus. Begin with the smallest possible magnification, make other adjustments, and then increase the magnification until the desired size is obtained.

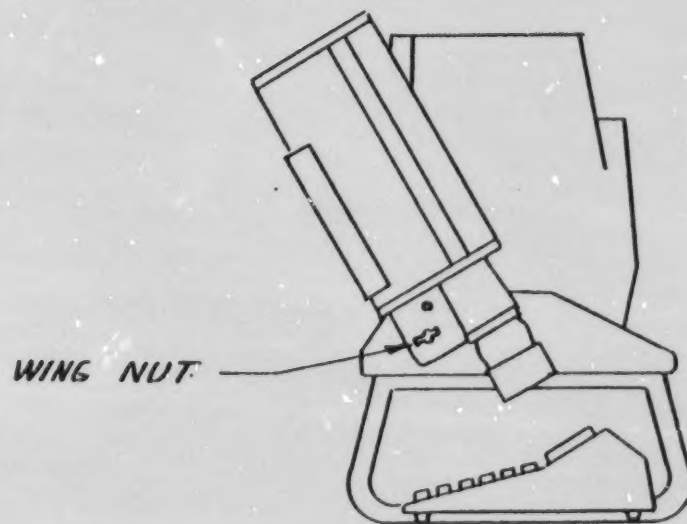
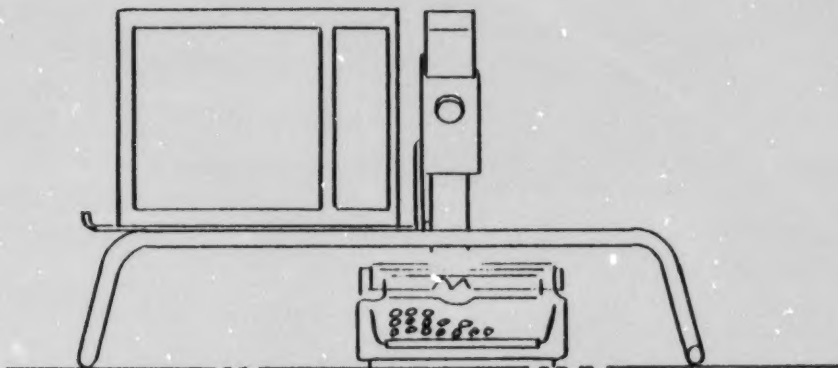
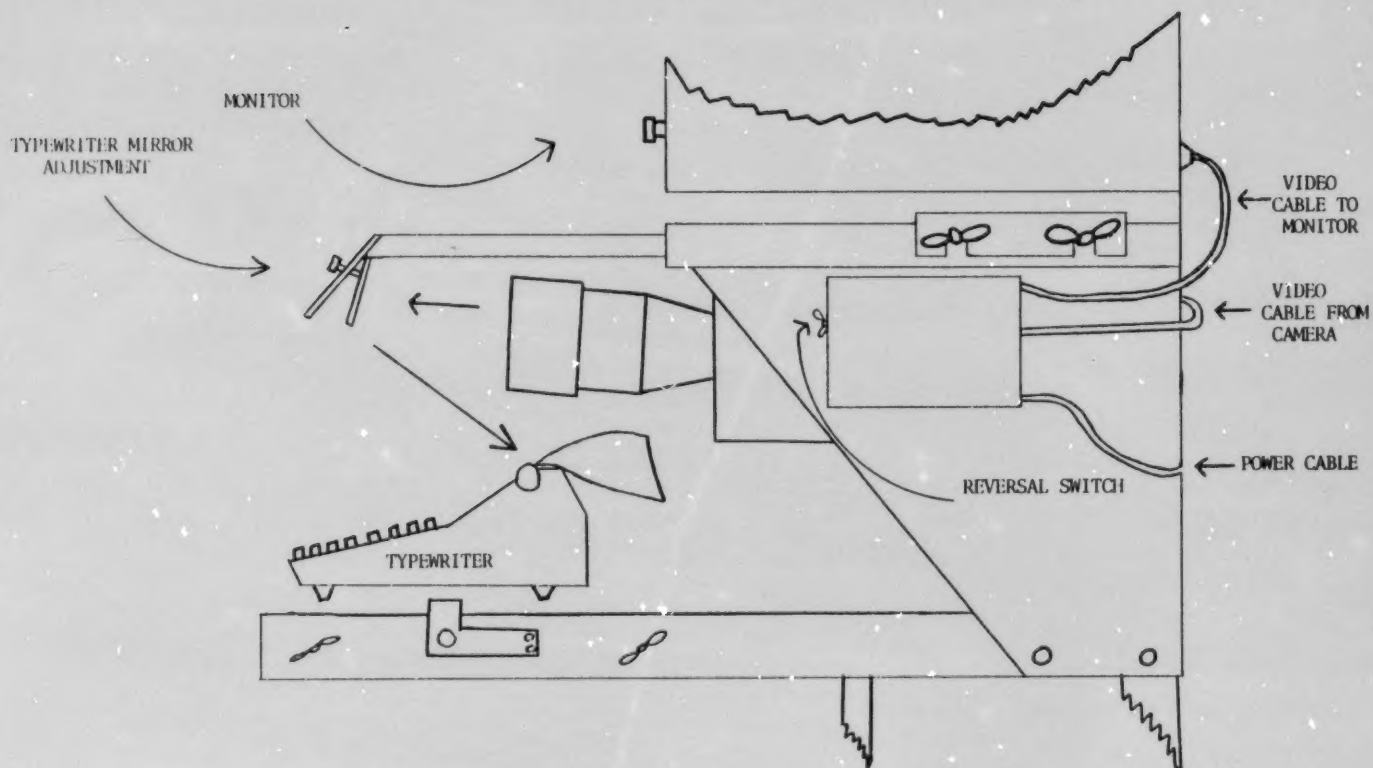


Figure 3
Typing with Apollo Portareader

PELCO LVA - 501 WITH TYPEWRITER POSITIONED



PELCO LVA - 501

NOTE: ILLUMINATORS SHOULD BE POSITIONED TO BEST
ILLUMINATE TYPEWRITER PAGE

Figure 4
Pelco with typewriter positioned

Illustration Courtesy of Pelco



Figure 5
Voyager with typewriter

The teacher may elect to use the goal statements on the following skills checklists. This will assist in writing annual goals and accompanying short term objectives. The tasks have been broken down in the following manner:

1. locating controls
2. preparing system
3. reading with the CCTV
4. writing with the CCTV
5. typing with the CCTV

These are instructional areas for students that are commonly addressed within an IEP.

Sample goal and short term instructional objectives are included. The teacher decides the various tasks that would be presented, breaks down the task into more discrete steps, decides upon criteria of mastery and anticipated dates of mastery; all based on individual needs of the student.

The screening section page will describe the student's present level of performance. The skill checklist will identify specific areas of instruction.

- I. The student can locate and describe the function of various controls. (The number and the location of controls varies with different models.) The student can operate the controls independently.

☐ power switch (on/off)
☐ monitor power
☐ camera
☐ magnification (zoom)
☐ focus
☐ aperture
☐ brightness
☐ contrast
☐ reverse image polarity
☐ vertical control
☐ horizontal control
☐ line markers
☐ reading platform or x-y table
☐ margin stops
☐ table drag or table brake

- II. The student can prepare the system for reading.

☐ plugs machine in
☐ turns on power
☐ selects preferred polarity
☐ focuses material at maximum magnification
☐ visually scans, i.e. uses the CCTV at minimum magnification to determine format of material
☐ adjusts magnification for smallest linear magnification
☐ adjusts margin stops and brake on x-y table

III. The student reads efficiently with the CCTV

- _____ maintains good posture and steady head position while viewing the center of the monitor
- _____ moves the X-Y table smoothly from right to left, returns in opposite direction performing a diagonal line change
- _____ adjusts for different sized print
- _____ adjusts for different types of reading material, e.g., single papers to thick books
- _____ adjusts for different quality print by adjusting brightness, contrast, polarity, magnification

IV. The student writes while using the CCTV.

- _____ locates and positions pencil or pen by viewing image on monitor
- _____ writes legibly with letters of an acceptable size
- _____ fills in spaces on computer scored answer sheets

V. The student can type and correct errors with the CCTV.

- _____ removes X-Y table if necessary
- _____ aligns typewriter under the camera
- _____ adjusts mirror for viewing typewritten material
- _____ engages image reverse control
- _____ adjusts zoom, focus, brightness, contrast, and polarity
- _____ corrects errors

INDIVIDUALIZED EDUCATION PROGRAM

Student Name: Samuel GenenskyDate: 10/1/82

Area in which special education will be provided: Use of low vision aid
 Subject Area(s): Use of low vision aid in subject areas
 Present level of performance: Student has extremely low vision, has not used aid before, assessment indicates 15wpm with aid.

Annual Goal: Student will read with CCTV at a rate of 30 wpm with good comprehension.

Instructor(s): (1) Teacher/Visually Impaired (2) (3)

SHORT TERM INSTRUCTIONAL OBJECTIVES	EVALUATION OF SHORT TERM INSTRUCTIONAL OBJECTIVES		
	Criterion for Mastery	Eval. Procedures, Eval. Schedule	Results/Date
1. Given printed material, student will read with CCTV at a rate of	20 wpm with at least 50% comprehension on 3 consecutive sessions.	teacher evaluation 11/15/82	
2. Given printed material, student will read with CCTV at a rate of	20 wpm with at least 80% comprehension on 3 consecutive sessions.	teacher evaluation 2/15/83	
3. Given printed material, student will read with CCTV at a rate of	25 wpm with at least 80% comprehension on 3 consecutive sessions.	teacher evaluation 4/15/83	
4. Given printed material, student will read with CCTV at a rate of	30 wpm. with at least 80% comprehension on 3 consecutive sessions.	teacher evaluation 6/10/83	
UNIQUE Methods: <u>Individual instruction, CCTV</u> and/or Materials: _____			

Comments: _____

SAMPLE
INDIVIDUALIZED EDUCATION PROGRAM

Student Name: Samuel Genensky Date: 8 / 15 / 82

Area in which special education will be provided: Cursive handwriting using closed circuit television

Subject Area(s): Handwriting

Present level of performance: Student cannot write but can print; uses fine point marker pen

Annual Goal: Student will write with CCTV.

Instructor(s): (1) Teacher/Visually Impaired (3)

SHORT TERM INSTRUCTIONAL OBJECTIVES	EVALUATION OF SHORT TERM INSTRUCTIONAL OBJECTIVES		
	Criterion for Mastery	Eval.Procedures, Eval.Schedule	Results/Date
Given cursive writing worksheets and CCTV, student will copy all the letters of alphabet.	Teacher satisfaction	Teacher observation 11/82	
Using the CCTV, student will legibly write 25 dictated words.	Teacher satisfaction	Teacher observation 2/83	
Using the CCTV, student will legibly write a minimum of a 5 sentence paragraph.	Teacher satisfaction	Teacher observation 6/83	

UNIQUE Methods Instruction in writing techniques with a CCTV

and/or Materials: _____

Comments: _____

SAMPLE
INDIVIDUALIZED EDUCATION PROGRAM

page 4 of 5

Student Name: Samuel Genensky

Date: 8 / 15 / 82

Area in which special education will be provided: Typing with closed circuit television

Subject Area(s): Typing

Present level of performance: Student can type approximately 25 words per minute but averages 10 errors per manuscript page. Student cannot see page while in typewriter.

Annual Goal: Student will turn in typewritten page with fewer than 3 errors per page.

Instructor(s): (1) Teacher/Visually Impaired

(3)

SHORT TERM INSTRUCTIONAL OBJECTIVES	EVALUATION OF SHORT TERM INSTRUCTIONAL OBJECTIVES		
	Criterion for Mastery	Eval.Procedures, Eval.Schedule	Results/Date
Given a dictated page of material to type, student will type, proof read, and correct errors.	With no more than 8 errors, 3 consecutive days.	Teacher evaluation 10/82	
Given a dictated page of material to type, student will type, proofread, and correct.	With no more than 5 errors, 3 consecutive days.	Teacher evaluation 3/83	
Given a dictated page of material to type, student will type, proofread, and correct errors.	With no more than 3 errors, 3 consecutive days.	Teacher evaluation 6/83	

UNIQUE Methods Individual Instruction using CCTV
and/or Materials:

Comments:

1. Students can use regular resource or reference materials in the classroom.
2. The CCTV may be used to show the student what he or she looks like. It allows the student to examine pictures of family, friends, scenery.
3. A recorded videotape can be interfaced with the CCTV for role playing, improving posture, and to help a child exhibiting inappropriate behavior.
4. The student can use the CCTV for map reading; i.e., to see where he lives, plot bus trips, plan vacations, etc.
5. Dissecting small animals and inspecting insects can be done.
6. Print-out and digital calculators can be used for mathematics or accounting.
7. Handicrafts such as needlepoint, sewing, crocheting, drawing, painting, etc. can be done.
8. Hobbies such as stamp collecting, recipes, electronic kit assemblies can be done.
9. Models with detachable cameras can be used with a tripod for distance tasks, e.g. reading music, or for viewing near detail of objects that cannot be placed under the camera in the usual fashion, e.g., carburetor on an engine.
10. Some CCTV models have built-in across the room viewing capabilities. The system can be aimed out of windows for a look at the outdoors. Chalkboards, graphs, bulletin boards and pictures on a wall can be viewed.
11. Certain models can be used for personal grooming, e.g., makeup application, hairstyling, manicure.
12. Thermometers, blood pressure gauges, adding machine can be viewed.
13. Notes can be taken and read more efficiently.
14. Drawings can be traced without removing the original.

15. A great deal of material that is not readily available in large type, can be easily read with the CCTV. The following represents only a small number of possibilities:

- personal mail
- greeting cards
- telephone directory and yellow pages
- a wide variety of magazines
- newspapers
- catalogs
- television guides
- banking materials, e.g., checks, statements, forms
- receipts and bills
- world and local atlases
- specialized dictionaries
- encyclopedias
- record jackets, "Top 10" lists
- job applications
- recipes and directions on containers
- instruction sheets for games
- jokes and joke books
- crossword puzzles
- college catalogs
- yearbooks
- school newspapers
- career education materials
- school lunch menu
- daily school announcements
- sports page (baseball scores)
- familiar material (i.e., Pledge of Allegiance)
- pattern directions
- tests
- short stories
- poems
- instruction sheets for games
- ink print flash cards
- brochures on recreational and cultural activities
- scout handbooks
- spelling list
- weather forecast

A P O L L O

CONSUMER CHART

	Portareader	Imager 100
PRICE: June 1982	\$1,750	\$2,550 *
Magnification	4x 45x	6x 60x
Zoom	6:1	6:1
Construction	Monitor and Detachable Camera	Two piece unit
Space Requirements	36" x 18"	36" x 18"
Portability	Yes	Difficult to move due to separate component
Lighting	Incandescent attached lamp	Quartz halogen illuminator
X-Y platform (movable table)	Yes, optional	Yes, standard
Margin Strips		
Margin Stops & Brakes	Yes	Yes
Warranty	2 year warranty standard	2 year warranty standard
Weight	28 lbs	60 lbs
Reverse Image	Yes, on monitor	Yes, on monitor
Electronic Window	Yes	Yes
Contrast and Brightness Control	front of monitor	front of monitor
Focus	on lens	on lens
Size Control	on lens	on lens
Screen Size	12 "	19"

Apollo Lasers Inc.
 6357 Arizona Circle
 P O Box 45002
 Los Angeles, CA 90045
 (123) 776-3343

*Note: Imager 100 comes standard with a typewriter attachment.

P E L C O

CONSUMER CHART

	L V A
PRICE: June 1982	\$ 1,765
Magnification	7 x 43x
Zoom	6:1
Construction	two piece unit
Space Requirements	20 x 24
Portability	moveable but not portable
Lighting	incandescent attached lamps
X-Y platform (movable table)	Yes, optional
Margin Strips	Yes
Margin Stops & Brakes	
Warranty	1 year
Weight	95 lbs
Reverse Image	Yes, on front of small box on the right side of unit under monitor bracket
Electronic Window	Yes
Contrast and Brightness Control	Yes
Focus	on lens
Size Control	on lens
Screen Size	19"

Pelco Industries
351 E. Alondra Boulevard
Gardena, CA 90248

V I S U A L T E K

CONSUMER CHART

	RS-10	Voyager
PRICE: June 1982	\$2,500	\$2,095
Magnification	4 x 60	4 x 45
Zoom		
Construction	Camera stand (tilt-able removable)	Modular 1 piece unit not removable external component
Space Requirements	14" x 20" for each piece (camera and monitor)	requires minimum amount 14" x 20"
Portability	moveable but not portable	Yes
Lighting	30 watt spot light bulb	florescent lighting built in
X-Y platform (movable table)	Yes	Yes
Margin Strips		
Margin Stops & Brakes	Yes	Yes
Warranty	1 year	1 year
Weight	50 lb monitor 45 lb camera	37 lbs
Reverse Image	on camera	left side front panel
Electronic Window	top of camera	on left hand side of control panel
Contrast and Brightness Control	on monitor	two small knobs center of control panel
Focus	located on front panel of camera base	control panel
Size Control	located on front panel of camera base	control panel
Screen Size	19"	12"

Visualtek
 1610 - 26th Street
 Santa Monica, CA 90404
 (213) 829-6841

CCTV Accessories

1. Typewriter Viewer: Allows the reader to see what he is typing and to make corrections.
2. Forward Viewer: Allows viewing of objects and material at 6 to 15 feet.
3. Margin Stops: Can limit the side to side movement of the viewing table.
4. Line Intensifier: Will block out a portion of the screen so that one line can be viewed at a time.
5. Reading Platform: An x-y reading table.
6. Vinyl Cover: A dust cover
7. Movable Desk: Allows the unit and desk to be rolled together.
8. Key Lock: Prevents unauthorized use. On/Off controlled by key.
9. Plexiglass Sheet: Keeps reading material flat on the x-y table.
10. Paperweight: Keeps books flat on x-y table.
11. Microfiche Attachment: Enables viewing of microfiche, Recordak microthin jackets, and aperture cards. Can accomodate 105, 70, 35, and 8 mm microfilm.
12. Dual Image System: For simultaneously viewing two different images on a split screen.

Standard=X

Apollo	Pelco	Visualtek
X	X	X
X	N/A	X
X	X	X
X	N/A	X
X	X	X
0	N/A	X
0	X	0
0	N/A	0
0	N/A	0
0	N/A	0
0	N/A	0

Code: X = standard feature

0 = optional feature

N/A = not available

13. Foot Operated Viewing Table: Designed to leave hands free for typing.
14. R. F. Adapter: Allows the Voyager XL (Visualtek) to be used with a home TV as a monitor.

Standard=X

Apollo	Pelco	Visualtek
N/A	N/A	0
N/A	N/A	0

1. As required, clean outer surfaces of monitor, camera, and x-y viewing table with any non-abrasive solution. (Check the label of the cleaner)
2. Every six months, move the x-y table as far as it will move in each of four directions (left, right, back, forward) and clean the exposed inner portions of the slides with a clean, lint-free cloth. Then apply a small quantity of lubricant to the inner sides of the slides.
3. The glass face of the monitor should be lightly dusted with a clean, lint-free cloth at least once a week. Do not use any cleaner or detergent. If there are very dusty spots or areas that are persistently dirty, a slightly moist rag may be used, followed immediately by wiping with a clean dry cloth.
4. Bulbs: spare bulbs should be kept on hand. Bulb information for various models follows: (as of June, 1982)
 - (a) PortaReader - 5130 for \$ 5.00
 - (b) Visualtek Voyager - B-VR (\$10.00 for 2 bulbs)
 - (c) Visualtek RS-10 - V-RS (\$10.00 for 2 bulbs)
 - (d) Pelco - GE -S93 (price not available)
5. Fuses: spare fuses should be available. Fuse information for various models follows:
 - (a) PortaReader - 2 amp
 - (b) Visualtek Voyager - 1.5 amp fuse
 - (c) Visualtek RS-10 - RS-10 stand 10 amp fuse
RS-10 monitor 1.5 amp fuse
 - (d) Pelco (not available)
6. Visualtek also provides a series of Service Bulletins which include circuit schematics and various other information. Bulletin M065 lists all Service Bulletins. Visualtek will provide copies of all Service Bulletins upon request.
7. The plexiglass sheets used to hold material flat can be cleaned with spray glass cleaner.

APOLLO

Warrants equipment under normal use from the date of purchase for a period of two years.

During the first year all parts and labor will be covered. During the second year all parts and labor are covered except the Vidicon tube. Illuminator bulbs are not covered. Service and adjustments after expiration of the warranty will be made at established factory prices.

Authorized Apollo Laser Service Center
Apollo Lasers, Inc.
Product Manager - EVA
6357 Arizona Circle
P.O. Box 45002
Los Angeles, CA 90045
(213) 776-3343

Sales and service information for the Florida area can be obtained from the main office.

PELCO

Warrants equipment proved defective for a period of one year after the date of purchase.

All warranty work shall be sent prepaid to Pelco's Gardena, California facility.

Pelco makes no warranties except for the intended use, and will not be liable for any loss or damage arising from the improper use of Pelco's merchandise.

Authorized Pelco Service Center

Pelco Industries, Inc.
351 E Alondra Boulevard
Gardena, CA 90248
(213) 321-5591

VISUALTEK

Warrants equipment for a period of one year from date of shipment.

Warranty includes all electronic items, such as the camera and all its parts, the monitor, lenses, mechanical parts, etc.

The warranty does not include light bulbs, fuses or other similar replaceable items. Damages such as nicks or scratches are not covered unless present when equipment is initially received and Visualtek is notified in 10 days.

Shipping and insurance charges to return defective parts to Visualtek are the responsibility of the users. In order to minimize delays and ensure the promptest possible service, Visualtek suggest the following methods of shipment:

- a. From California, Washington, Oregon, Idaho, Nevada, and Arizona: use United Parcel Service (UPS), truck shipment.
- b. From other states: use UPS Blue Label Air Service when available. If UPS does not serve your area use the REA Air Express.
- c. Insure the return shipment as instructed by Visualtek Service Department.

Shipping and insurance charges to deliver replacement parts are paid by Visualtek under warranty.

After the one year warranty period has expired, Visualtek has available a warranty extension agreement which is effectively an equipment maintenance contract at a modest cost. You will automatically be notified shortly before the end of the one year warranty period.

Authorized Visualtek Service
(All inquiries regarding service and equipment)

Visualtek Service
4955 West 145 Street
Hawthorne, CA 90250
(213) 978-8835
Ask for service manager

Visualtek (Administrative & Sales Office)
1610 - 26th Street
Santa Monica, CA 90404
(213) 829-6841

The following is a summary of the responses received from a questionnaire sent to selected low vision clinics across the United States. Questionnaires were sent to twenty low vision clinics listed in the Directory of Agencies Serving the Blind and Visually Handicapped in the United States.

SUMMARY OF RESPONSES
TO QUESTIONNAIRES:
SENT TO FLORIDA VISION
TEACHERS, 1981

1. Do you have a closed circuit television system (CCTV) available in your clinic?

Yes: 8 No: 1

2. What factors determine potential CCTV users?

- *Economics.
- *Patient's desire.
- *Inability to read for any extended length of time consistently and with comfort with any other type of a low vision aid.
- *Need to do a lot of reading for vocational or educational program. 4
- *Ability to read a variety of print types with the CCTV.
- *Increased reading speed, comprehension, etc., with the CCTV.
- *Age.
- *General level of mental alertness.
- *Physical impairments associated with poor vision.
- *Some diseases are ideal, especially R.P.
- *Range of visual acuity, roughly 20/200 - 20/1000.
- *Peripheral vision.
- *Fixation.
- *Previous reading history.
- *Suitability of needs.
- *Avid readers and people with 5% vision or less.
- *Vision either fluctuating or very low.
- *Visual functioning and visual acuity. 2
- *Eye disease.

3. On the average, how much training time is given on reading with the CCTV?

- *3 sessions
- *2 - 15 hours
- *30 minutes
- *5 hours
- *demonstration only 3

4. Any comments regarding the use of CCTV?

- *Excellent instrument for those who need it and can use it.
- *They can be ideal, they tend to be over prescribed, many people who see with them would rather not bother.

*They can be a definite asset to any low vision clinic. They need to be used when the patient shows specific need for it.

*A CCTV should not be recommended until after a comprehensive low vision exam.

*The CCTV can be difficult to learn to use efficiently, but it has proven to be an invaluable reading system for those whose needs match their abilities with the CCTV. CCTV's are not usually prescribed without a period of training to provide me with more accurate estimation of the patient's potential use of the CCTV.

The following is a summary of the responses received on a questionnaire sent to teachers of the visually impaired in the state of Florida. Of the 107 questionnaires sent, 46 responded.

SUMMARY OF
QUESTIONNAIRES
SENT TO FLORIDA
VISION TEACHERS,
1981

1. Do you teach reading to some students with a closed circuit television system (CCTV)? Yes: 16 No: 28
2. Do you have a screening form for determining which students will use a CCTV? Yes: 1 No: 31

If you don't have a form what factors determine potential users?

Amount of vision student has, whether student is able to get books in large print. Informal assessment of (1) print size which students can recognize readily, (2) recommendation of doctor or optometrist, (3) ability of student to use equipment, (4) student's need for materials otherwise available, (5) accessibility to equipment.

If large print is not available or if student can't use standard print. One student needs large print books, we were unable to get her language book in large print to begin the school year with, so we used the CCTV. Extreme low vision; large print even with a magnifying bar is insufficient.

Extreme perception problems (enables teacher to present small amount of material at one time).

Extreme figure-ground problems.

Visual acuity, medical condition, having problems.

We are currently developing a quick screening device to determine what size print best suits the needs of a visually impaired child of reading ability (using a basic sight word vocab. in different size print). If the child fails to use the large print size, the CCTV is used.

All my students are introduced to the Visualtek. They decide on their own the frequency and advantages, unless instructed by me to use it (especially in a crowded resource period).

Teacher observation and student feedback of student/rate

material interaction. They cannot read large print (12-18 pt type) easily and/or reg. print material, are not available in large print; also, use of magnifier doesn't provide enough magnification.

Visual acuity, motivation, inability to use Braille as reading and writing medium, age, accessibility to CCTV. If they can't see the required printed materials sufficiently to read it, then they use the CCTV. Need varies from child to child and from time to time.

Depends on eye condition.

Size of regular or small print charts, form, books, etc. in relation to need of student.

Need - Unable to see regular print and finds it more comfortable to use the CCTV than magnifier or l.t. book. Manual dexterity, eye-hand coordination, intellectual level, level of concentration.

Degree of visual impairment and availability of large print materials.

Useful vision - availability of print sizes - potential for use of other optical aids (magnifier, etc.) -

whether print or braille is more comfortable for student visually and emotionally.

Students who are having great difficulty in seeing large print texts or who are unable to use a magnifier (because too awkward).

3. Do you have a training manual or a list of teaching objectives for use with a CCTV? Yes: 2 No: 34

The following is a summary of the responses received on a questionnaire sent to residential schools for the visually impaired in the United States. Of the 49 questionnaires sent, 31 responded.

SUMMARY OF RESPONSES
TO QUESTIONNAIRES:
SENT TO RESIDENTIAL
SCHOOLS, 1981

1. Do you teach reading to some students with a closed circuit television system (CCTV)? Yes: 20 No: 9
2. Do you have a screening form for determining which students will use a CCTV? Yes: 2 No: 22

If you don't have a form, what factors determine potential users?

- *Informal evaluation, their visual acuity and ability to see the print through using the TV.
- *Student motivation, teacher recommendation, CCTV's are open for use by any of our students.
- *Student instruction and response to instruction.
- *The ease with which the student can read from large print.
- *Accessibility to printed matter, vision, but with inability to stay at reading task because of fatigue. Can handle print but not braille-because of physical or emotional reason.
- *Person who does not use braille and has some useful vision.

- *Based upon student's need-determined by media specialist and low vision person.
- *Personal evaluation.
- *We would try the TV with the student to see whether it made him more efficient reader. We have also used the machine with some students to motivate reading.
- *Student's ability to use equipment-vision.
- *Recommendation from ophthalmologist.
- *Partially sighted students having difficulty with large print are evaluated by a staff member on the CCTV.
- *Users are those low-vision students who cannot locate needed materials in large print.
- *Level of visual efficiency, fine motor coordination, academic and/or developmental level.
- *Print size.
- *Just visual acuity and child's ability.
- *Is the student's vision such that he/she can benefit from the use of the CCTV?
- *Have the student try the CCTV on a short-term basis.
- *Teachers recommend potential users. Students request permission to use CCTV.
- *Eye specialist evaluation. Trial and error.

3. Do you have a training manual or a list of teaching objectives for use with a CCTV? Yes: 3 No: 25

This questionnaire was sent to thirty university training programs for teachers of the visually impaired. Eleven have replied. The following is a summary of their responses.

SUMMARY OF RESPONSES
TO QUESTIONNAIRES:
SENT TO UNIVERSITY
PROGRAMS, 1981

1. Do you have a closed circuit television system (CCTV)?
Yes: 5 No: 6
2. Do you have any screening devices for determining potential CCTV users? Yes: 0 No: 9
3. Do you have a training manual or a list of teaching objectives for using a CCTV? Yes: 2 No: 7

- ACCOMMODATION - adjustment for seeing clearly at a distance less than infinity
- CONCAVE LENS - lens having power to diverge rays of light; also known as diverging, reducing, negative, myopic, or minus lens; denoted by the minus sign
- CONVEX LENS - lens having power to converge rays of light and bring them to focus; also known as converging, magnifying, hyperopic, or plus lens; denoted by the plus sign
- DIOPTER - unit of measurement of strength or refractive power of a lens; a one diopter (D) lens brings a ray of light to focus at one meter; the dioptic power of a lens equals the reciprocal of the focal distance measured in meters
- FIELD OF VISION - the entire area which can be seen at one time by the fixed eye
- FOCAL DISTANCE - the distance rays of light travel after refraction; reciprocal of the dioptic power of the lens
- FOCUS - point to which rays of light are directed after passing through a lens
- GLARE - quantity of light which causes discomfort in the eye resulting from either a direct source of light within the field of vision or from reflection of a light source not in the field of vision
- LIGHT INTENSITY - amount of illumination measured in foot-candles; one foot-candle is the intensity of light falling upon one square foot from a point source of light of one international candle; the intensity of light on an object is inversely proportional to the square of the distance from the light source
- LINEAR MAGNIFICATION - the ratio of the size of the image to the actual size of the object or print
- MAGNIFICATION - the strength or refractive power of a lens divided by four; e.g., a 48 diopter lens has a magnifying power of 12x

NEAR POINT OF - the nearest point at which the eye can
ACCOMMODATION focus on an object distinctly; varies
according to the power of accommodation
and age

NEAR VISUAL - ability to see objects or print at
ACUITY actual reading distance; normal reading
distance is given as 14 to 16 inches
(35 to 40 centimeters)

Adrian, R.J. "Psychological Evaluation of Low Vision Patients Using Closed Circuit Television." E.E. Faye & C.M. Hood (Eds.), Low vision. Springfield, Illinois: Charles C. Thomas, 1975.

This chapter discusses the use of the CCTV for psychological testing. A formal study was presented. The results indicated that the majority of low vision patients showed positive changes in scores when tested on the CCTV. Reading scores increased using the CCTV; tests used were the WRAT and the Gray Oral Reading Test.

Apollo Lasers, Inc. How to Use an Electronic Visual Aid in the Classroom. Los Angeles, CA: Undated.

The following topics concerning the use of electronic visual aids (EVA's) in the classroom are discussed:

- I. Location of a system in the classroom
- II. User age levels and effectiveness
- III. Learnable skills with a system
- IV. Parental and community aspects

Many useful suggestions and guidelines are given in each section which would be helpful when incorporating an EVA into the classroom and lesson plans.

Available from Apollo Lasers, Inc.

Blanche, E. and A. Cook Monster Reading Series. Los Angeles: Bowmar/Noble Publishers, Inc., 1976.

The Monster Reading Series consists of one teacher's guide and twelve different story books, each one including the main character, "monster," and his various adventures.

Included in the teacher's guide are suggested activities for the children to carry out after reading each story. These activities can be easily adapted for visually impaired students.

The readers are printed in 14 point type, adequate for many low vision students. The spacing between words, consistent format, and the sans serif type style would be useful to the student using a CCTV or Optacon.

Faye, E.E. and C.M. Hood, "Low Vision Services in an Agency: Structure and Philosophy." The New Outlook for the Blind, 69 (6), June, 1975.

This article gives a comprehensive description of the Low Vision Services of the New York Association for the Blind.

- CCTV's are used for reading evaluations and psychological testing.
- CCTV is prescribed for patients whose acuity is too poor to benefit from an optical aid or for those who, because of school or job requirements, have a particular need to supplement their optical aid with another type of magnification.

However, television is never considered until the complete low vision examination has explored the use of all other types of aids. "More patients reject television after a thorough trial than accept it."

Feld, G.F. and C.C. Hall, "The CCTV as an Art Tool." Journal of Visual Impairment and Blindness, April 1980, 74 (4), 151-153.

This article describes an art program for visually impaired students using the CCTV. It not only helped the student's drawing abilities, but also seemed to improve visual efficiency. Guidelines for developing a similar program are given.

Friedman, G.R. "The Closed-circuit Television Reading System: Fact or Fiasco?". New Outlook for the Blind, October 1973, 67 (8), 346-351.

The article first describes a basic CCTV system and then details the engineering problems which make the CCTV difficult for a visually impaired person to use. These include problems with the design and placement of the control knobs, stabilization of the viewing matter, maneuverability of the X-Y table, residual image problems, maintenance, and cost. Some recommendations to manufacturers are given for designing new CCTV models.

Genensky, S.M., H. E. Petersen, R.W. Clewett, and H.L. Moshin. Information Transfer Problems of the Partially Sighted: Recent Results and Project Summary. Santa Monica, CA: The Rand Corporation, 1975.

This report begins with three brief summaries of Rand reports on the use of binoculars as a visual aid for the partially sighted, interactive classroom T.V. systems, and double X-Y platform reading tables. These are followed by indepth reports on an experimental secretarial CCTV system, pseudocolor experiments, CCTV reading rates of person with normal vision, and color vision testing.

Genensky, S.M., H.E. Petersen, H.L. Moshin, R.W. Clewett, and R.I. Yoshimura. Advances in Closed Circuit T.V. Systems for the Partially Sighted. Santa Monica CA: Rand Corporation, 1972. (ERIC Document Reproduction Service No. ED 066 880)

This is the final report to Social and Rehabilitation Services on the project at Rand Corporation to design, fabricate, and informally test CCTV systems. The report describes in detail the mechanical and electronic features of Randsight II and its operations. Also reported are:

- tests of use by partially sighted persons on the Randsight I
- research on electronic image enhancement, contrast, reversal, electronic windows, and video information processors
- a light box test to determine if a person would benefit from using a CCTV for reading
- recommendations for features which should be included in the design of a CCTV system
- a review of the research conducted on CCTV's

The results of testing partially sighted persons on Randsight I gave some valuable information. Acuties, eye conditions, reading rates, and magnification levels were recorded. Persons with vision as low as 20/1300, due to cataracts, were able to read with the CCTV.

Goodrich, G.L., E.B. Mehr and N.C. Darling. Parameters in the Use of CCTV's and Optical Aids. American Journal of Optometry and Physiological Optics, December 1980, 57 (12), 881-892.

The study presented was designed to examine the variables affecting the use of CCTV's by 96 veterans who received training through the Veteran Administration Blind Rehabilitation Centers. Each subject study had used a CCTV for at least two years.

Included in the data from this study are: reading speeds with the CCTV compared to reading speeds with optical aids (for subjects using both) reading, durations, linear and effective magnifications used by subjects, types of reading materials, far and near visual acuities, and the interrelationships among the variables.

Because of the relatively large number of subjects in this study, the conclusions drawn from the data give valuable information on the use of CCTV's.

Inde, K. "Low Vision Training In Sweden." Journal of Visual Impairment and Blindness, October 1978, 72 (8), 307-310.

This article describes low vision services in Sweden. Persons requiring aids are divided into four groups according to their eye problem:

1. central scotomas
2. nystagmus
3. limited peripheral field but retention of central vision
4. forms of amblyopia

Each type of problem is described and the reading adjustments are discussed.

Mintz, M.J. "Closed Television: Its Value in Low Vision." In E.E. Faye and C.M. Hood (Eds.), Low Vision. Springfield, Illinois: Charles C. Thomas, 1975.

This is a short chapter discussing the characteristics, advantages, and disadvantages of the CCTV as an optical aid. Several case histories are presented. The author states:

"We feel that the educational area has not been explored sufficiently using the CCTV. We have seen children being taught to read who have a corrected visual acuity of 10/200 to 10/400. They were being taught to read with their nose and were making headway, but the extra ease of both teaching and reading with CCTV was beyond description. Red tape and economic factors often prevented a CCTV being made available to these children." P. 40

Pors, B. "Experimental Provision of a Closed Circuit Television at a Danish Public Library." Journal of Visual Impairment and Blindness, March 1980, 74 (3), 102-104.

This article presents the results of an experiment on the use of a CCTV placed in a Copenhagen public library. Many of the persons involved in the study were able to read with the CCTV who had not been able to do so for a number of years due to the severity of vision loss. Of the 106 persons in the study, a significant number expressed an interest in having a CCTV in their own library. Most persons used letter heights from 2 to 6 cm.

Rossi, P. "Closed Circuit Television - A Method of Reading." Education of the Visually Handicapped, Fall 1980, 12 (3), 90-94.

The author describes a basic CCTV, very briefly discusses how it is recommended, and offers suggestions on how to use it for reading.

A study was conducted with ten visually impaired students in an itinerant program; seven read large print, three were braille readers. Within one month, seven of the students increased their reading speed on the CCTV. It was noted that the CCTV was not a disruptive factor in regular classroom.

The advantages found in using the CCTV were the ability of the student to view his own writing with the split screen and the immediate availability of print materials. Disadvantages noted were the cost and the lack of portability. However, large printed materials are also costly. "With CCTV many students who read braille or super large print can read regular print materials as soon as fellow classmates can. Economics are not a prohibiting factor as CCTV is really more economical than large print."

p. 94

Schnur, R., G. Fonda and H. Thomas, "Use of Closed Circuit Television as a Low Vision Reading Aid." In Equal Educational Opportunity for All the Visually Handicapped. Philadelphia: Association for the Education of the Visually Handicapped, 1974. (ERIC Document Reproduction Service No. Ed 115 059)

This paper details a project undertaken to explore the ways in which partially sighted persons might benefit from the use of a CCTV, characteristics of potential CCTV users, and actual ways in which CCTV users incorporate a CCTV in their daily routine. The data compiled from this study offers valuable information to be considered when evaluating a potential CCTV user.

The subjects in this study were 75 low vision persons between the ages of 8 to 90 years, with 60% under the age of 24 years. Visual acuities in the better eye with correction ranged from roughly 1/200 to 20/200, with two thirds of the sample less than 20/320. The study was conducted in two parts: evaluation of subjects on reading with the CCTV and then follow-up progress checks on those recommended for and given a CCTV.

Of the 75 subjects in this study, only 15 were recommended for a CCTV. Reasons for recommending or not recommending were given. Case studies for some of the subjects are described for the purpose of illustrating the ways in which CCTV's were put to use.

In discussing the findings of the project, the authors suggest that the usefulness of a CCTV for a particular individual should only be assessed through a trial period with the device. A trained person, familiar with the whole range of low vision training and aids, should supervise the initial trial. Evaluation and training considerations are discussed.

Turner, P.J. "The Place of CCTV in the Rehabilitation of the Low Vision Patient." New Outlook for the Blind, May 1976, 70 (5); 206-214.

This article provides a description of a CCTV magnification system and compares its advantages and disadvantages with those of conventional low vision aids. Design features are discussed.

Reasons for and against prescribing CCTV's are explained.

A study done by Genensky and his colleagues (1972) is summarized. One indication from the information reported was that, while there is no direct relationship between visual acuity and CCTV reading ability, there is an approximate relationship. The poor performance of persons with cataracts was also noted. A summary of the VA study done by Mehr, Frost, and Apple (1973) is also given.

A variety of technological features currently in use around the world are described and suggestions for improvements are given.

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Schnur, R., G. Fonda and H. Thomas, "Use of Closed Circuit Television as a Low Vision Reading Aid." In Equal Educational Opportunity for All the Visually Handicapped. Philadelphia: Association for the Education of the Visually Handicapped, 1974. (ERIC Document Reproduction Service No. ED 115 059)

Turner, P.J. "Place of CCTV in the Rehabilitation of the Low Vision Patient." New Outlook for the Blind, May 1976, 70 (5), 206-214.



VSC Speed Listening Adapter

Model LOC-1



APH VARIABLE
SPEECH CONTROLTM MODULE

This Product Meets
U.S. Government
Safety Standards

Manufactured by

American Printing House for the Blind

Figure 6
Compressed Speech Devices

(Photographs Courtesy of
APH and VSC Corporation)

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Listening is a very important element in the education of a visually impaired student. The Compressed Speech Device compresses tapes made on standard cassette equipment. It allows adjustment of speed of the tape and eliminates the "chipmunk" sound at higher speeds. This allows the student to compress up to 2.5 times recorded speed, enabling students with ten or more hours of listening to select listening rates of up to 375 words per minute.

Listening skill instruction should be provided in a sequential manner. Ideally, listening comprehension lessons should have an introductory lesson followed by short lessons of approximately 15 minutes. Each lesson should contain three parts: a presentation time, a comprehension check (with multiple choice answers) and an answer check. The material should emphasize the following: vocabulary, comprehension, interpretation, and generalization. The lessons should be graduated, increasing in length, intricacy, and complexity from grade to grade. A minimum schedule for listening comprehension should be twice a week. (Bischoff, 1979)

Compressed speech devices permitting normal pitch have been available for nearly twenty years. Despite the importance of auditory learning by visually impaired students, compressed speech devices have not played a significant part in the educational process. As early as 1962, Foulke and his colleagues found no significant loss in comprehension with rates of presentation up to 275 words per minute for blind students in grades six through eight.

Studies involving sighted students warrant review. Woodcock and Clark (1968) found listening rates of 228 and 278 words per minute more efficient for learning and retention than for normal rates of approximately 178 words per minute for elementary students. In another study conducted by Woodcock and Clark (1968), similar results were reported with culturally disadvantaged fourth graders. Ihnat (1975) reported on differences in comprehension for second grade students when rates of presentation increased, but Kuperberg (1975) reported that as the rate of presentation increased, comprehension for sixth grade students decreased.

While not all studies point to a positive correlation between better comprehension with increased rate of presentation, most report no significant loss in comprehension with respect to increased rate. None of the studies report changes in comprehension as rate of presentation is increased when systematic instruction is provided over time.

Auditory training is considered an important part of the special needs curriculum by teachers of the visually impaired (School and Weihl, 1979). The limitations inherent in braille and low vision aids for reading, emphasize the importance of auditory learning. It is possible that the use of compressed speech devices (now available from American Printing House for the Blind or FIMC/VH) can have significant impact on information acquisition.

When listening is speeded up, the result is a distorted speech sound like "Donald Duck." This distortion can be tolerated when accelerated, but for many students it becomes unintelligible. With the aid of speech compressors, the student can increase the speed of the tapes and eliminate the distortion. This will result in less time spent in reading, while processing the information at a normal rate. Speech compression can also reduce boredom and inattention.

Students who may benefit from compressed speech:

1. Any visually impaired student who has hearing within normal limits and who would like to reduce reading time
2. Other exceptional learners. (Gifted, learning disabled, educable mentally handicapped, and emotionally handicapped)
3. Any student who would like to reduce reading listening time.

Student Name _____

School _____

Date _____

Date of Birth _____

Grade _____

I. Is hearing within normal limits? _____ yes
_____ no

If not, explain _____

Does student appear to have any auditory perception
problems? _____

If yes, explain _____

II. Check equipment student uses independently

_____ talking book machine

_____ cassette player from Library of Congress

_____ cassette player/recorder from American
Printing for the Blind

_____ reel to reel recorder

_____ variable speed controls

_____ compressed speech devices

Comments _____

III. Performance on tests/series of Listening Comprehension, e.g., Durrell-Listening Series, Listening Comprehension subtest of Stanford Achievement Test.

Instrument/Series

Date Administered

Score/Level

Are these scores consistent with his age, grade or his academic abilities? _____

IV. Has the student worked with any of the following listening comprehension programs?

_____ Listen and Think

_____ S R A

_____ Durrell Listening Reading Series

V. What is the student's preferred listening speed using a compressed speech device?

_____ words per minute

VI. Is the student capable of ordering listening materials from:

_____ Talking Book Library

_____ Recording for the Blind

VII. Additional Comments _____

Date _____

Evaluator _____

Run on alternating current (AC)

FEATURES OF SPEECH
COMPRESSORS

Make uncompressed recordings.

Have complex electronic processors.

Will expand or compress in the playback mode, with the result that their pitch and voice quality will sound normal regardless of their playback speed.

Will compress up to two and one half times normal recorded speed enabling people with about ten hours of listening to read up to 400 words per minute.

Have a pitch corrector to eliminate the distortion (Donald Duck) caused by speeding up the tape.

If a student wants a recording slowed down (i.e., for taking notes or transcribing material), the speech can be expanded without distortion.

A.P. H. Compressed Speech Module
American Printing House for the Blind
1839 Frankfort Avenue
Louisville, KY 40206 (available on quota)

SOURCES OF SPEECH
COMPRESSORS

A7 Speech Controller
Variable Speech Control Company
2088 Union Street
San Francisco, CA 94123

T C S Recorder
Science for the Blind
Box 385
Wayne, PA 19087

Varispeech II
Lexicon, Inc.
60 Turner Street
Waltham, MA 02154

Am Bi Chron Pitch Shifter
Mr. Richard Kock
67 Speech Street
Lynbrook, NY 11563

Plug module into outlet.

Connect to cassette player with patch cord from jack on module to auxiliary output jack on player.

Turn module on.

Adjust variable speed control of player.

Adjust volume and correct pitch on module.

OPERATING THE
APH COMPRESSED
SPEECH MODULE

Plug adapter into outlet.

Plug adapter into cassette player with attached cords, input cord into auxiliary input jack, output cord into auxiliary output jack.

Turn adapter on.

Adjust variable speed control of player.

Adjust pitch control on adapter.

OPERATING THE
VSC SPEED LISTENING
ADAPTER

The teacher may elect to use the goal statements on the following skills checklist. This will assist in writing annual goals and accompanying short term objectives. The tasks have been broken down in the following manner:

1. setting up equipment
2. identifying parts of machine
3. operating equipment

Sample goals and short term instructional objectives are included. The teacher decides when the various tasks would be presented, breaks down the task into more discrete steps, decides upon criteria of mastery and anticipated dates of mastery; all based on individual needs of the student. The screening section page will describe the student's present level of performance. The skills checklist will identify specific areas of instruction.

CHECKLIST OF SKILLS

The student will be able to set up compressed speech machine.

- _____ plug AC cord into wall outlet
- _____ plug the adapter into module input
- _____ plug end of adapter into output module
- _____ turn on power of module and playback machine
- _____ set the volume and tone on playback machine to comfortable listening pitch

The student will be able to identify the parts of the machine and describe their functions.

- _____ identifies patchcord
- _____ identifies A/C cord
- _____ identifies variable speed control
- _____ identifies pitch control

The student will be able to compress the speech using a compressed speech device.

- _____ start tape or record on playback machine
- _____ increase speed using the variable speed control
- _____ adjust pitch control until voice has more normal pitch

SAMPLE
INDIVIDUALIZED EDUCATION PROGRAM

page 2 of 3

Student Name: Jose Feleciano

Date: 10 / 1 / 82

Area in which special education will be provided: Use of compressed speech device

Subject Area(s): Listening

Present level of performance: Student has not previously used equipment. Current auditory comprehension is adequate at an average rate of 150 wpm.

Annual Goal: Student will double listening rate with compressed speech device with adequate comprehension.

Instructor(s): (1) Teacher/Visually Impaired

(3)

SHORT TERM INSTRUCTIONAL OBJECTIVES	EVALUATION OF SHORT TERM INSTRUCTIONAL OBJECTIVES		
	Criterion for Mastery	Eval. Procedures, Eval. Schedule	Results/Date
1. With compressed speech device the student will be able to listen to a selection at a minimum rate of 190 wpm and answer questions with	60% accuracy on 3 consecutive sessions.	teacher evaluation 11/15/82	
2. With compressed speech device the student will be able to listen to a selection at a minimum rate of 190 wpm and answer questions with	80% accuracy on 3 consecutive sessions.	teacher evaluation 2/15/83	
3. With compressed speech device the student will be able to listen to a selection at a minimum rate of 250 wpm with	80% accuracy on 3 consecutive sessions.	teacher evaluation 4/15/83	
4. With compressed speech device the student will be able to listen to a selection at a rate of 300 wpm with	80% accuracy on 3 consecutive sessions.	teacher evaluation 6/10/83	
UNIQUE Methods _____ and/or Materials: <u>Individual Instruction, tape recorder, tapes, compressed speech device</u> <u>APH Listen and Think, other listening skill tapes</u>			

Comments: _____

1. With either device, the rate of compression can be calculated by timing a recorded passage while played at normal speed and when compressed. By dividing the time of playing without comprehension by the time of playing with compression, one obtains the degree of compression. For example, if a recorded passage played normally requires 60 seconds and when played more rapidly by adjusting the variable speed control of the player required only 30 seconds, the degree of compression would be $60/30 = 2$.
2. Compressed Speech Device can be used with any recorded material. However, clarity of sound during playback will vary greatly according to the quality of the tape recording. Studio produced tapes can be compressed considerably faster than the ones where background noise or less than ideal acoustics are present.
3. Teacher should record rate of presentation and comprehension frequently. The teacher should slowly increase rate over a period of time. Speed listening is like speed reading a fair amount of practice is required to achieve good comprehension at higher playback speeds. Students should understand that there is no "good" starting speed, just a pace they feel comfortable with.
4. Initially use recordings of interest to the student.
5. When the VSC module is in the compression or expansion mode with the volume set for a normal listening level, a popping noise may be heard in the speaker when there is no sound coming from the playback machine.
6. Retain all shipping cartons to the compressed speech machines in case they need to be returned to the manufacturer for servicing. Because of the advance technology employed in these units, field service is not practical.
7. After introduction and familiarization with the device, selected reading assignments (e.g., short novels, chapter in history text) should be completed with the rate increased.
8. Children should be prepared in advance for the "funny sound" that both compression and expansion produce. This is particularly true when tapes are slowed down.

COMPRESSED SPEECH DEVICES

CONSUMER CHART

	V S C	A P H
Range of Speed	2.5 original speed	2.5 original speed
Compact	yes	yes
Weight	11 ounces	not available
Braille Instructions	yes	yes
Large Print Instructions	yes	not available
Compatible with	Library of Congress C-76 C-77 Cassette Machine	APH Modified Variable Speed Machines - APH Talking Book Machines GE Cassette Recorder
Warranty	6 months	1 year from date of purchase
Price June 1982	\$95.00	\$97.50
	Variable Speech Control Company of San Francisco 185 Berry Street San Francisco, CA 94107 (415) 495-6100	American Printing House 1839 Frankfort Ave. P.O. Box 6085 Louisville, Kentucky 40206 available on quota

These are tests recommended by Florida teachers of visually impaired as compiled from the survey. (1981)

1. Sequential Tests of Educational Progress (STEP)
2. V.I.T.A.P. (Visco Tests of Auditory Perception)
3. Durrell Listening Comprehension Test
4. Listening Comprehension subtest of Stanford Achievement test
5. Meacham Test Informal Assessment (AFB)
6. Goldman-Fristoe-Woodcock Auditory Skills Test
7. Learning Accomplishment Profile
8. Wepman
9. I.T.P.A. (Illinois Test of Psycholinguistic Abilities)
10. Informal Assessment of Listening Skills
11. Hearing, as opposed to listening, should be tested
12. Informal

For further information, contact:

(speech therapist, assessment personnel, etc.)

APH COMPRESSED SPEECH MODULE

APH will warrant new electronic machines for one year from the date of purchase.

The warranty does not apply to inadequately charged batteries, or damage due to customer neglect.

After the one year general warranty has expired, APH will warrant repair work for 90 days.

American Printing House for the Blind
1839 Frankfort Avenue
P. O. Box 6085
Louisville, KY 40206

VSC SPEED LISTENING ADAPTER

Warrants for a period of six months from the date of original purchase.

This warranty is limited to the original purchaser at retail and is not transferable. This warranty shall only cover defects arising under normal usage.

When shipping unit back to factory, it must be packed carefully and shipped prepaid.

The Variable Speech Control Company
185 Berry Street
San Francisco, CA 94107
(415) 495-6100

MAINTENANCE

- * To remove dust or dirt from compressed speech machine; use damp cloth. DO NOT apply any cleaning liquid directly on unit.
- * Be careful not to have any liquid (coffee, soda, etc,) on or near machine.
- * It is important to remember to turn compressed speech machine off when not in use.

The following is a summary of the responses received on a questionnaire sent to teachers of the visually impaired in the state of Florida. Of the 107 questionnaires sent, 46 responded.

SUMMARY OF
RESPONSES
QUESTIONNAIRES
SENT TO FLORIDA
VISION TEACHERS,
1981

1. Do you have a screening form or use a particular test for determining which students require training in listening skills?
Yes: 9 No: 31

Name of test:

Meachan test (for sighted) Informal Assessment AFB
Goldman-Fristoe-Woodcock Auditory Skills Test
Learning Accomplishment Profile
"Listening Skills Series for Visually Impaired." Available through FIMC-VI
Wepman, APH Listen and Think Series, teacher observations during social conversation and academic tutoring.
Test whether certain objectives in listening section of "Focus on Individualized Programming for the Vh" from Pa. Mat. Center for VH can be achieved.
ITPA Illinois Test of Psycholinguistic Abilities
Informal Assessment of Listening Skills (Jack Little)

2. Do you have a curriculum outline or a teaching guide for improving listening skills: Yes 17 No: 24

Name of guide:

APH Listen and Think 9
Pennsylvania Materials Center for the Visually Handicapped
Goals and Objectives Part II 8
Reading for Comprehension Series 1
GOAL Language Development Kit
Barnell Loft Specific Skills Series

3. Do you teach some students to use compressed speech devices?
Yes: 6 No: 38
4. Do you use the TSI Game Center for improving listening skills?
Yes: 0 No: 43

The following is a summary of the responses received on a questionnaire sent to residential schools for the visually impaired in the United States. Of the 49 questionnaires sent, 31 responded.

SUMMARY OF
RESPONSES
QUESTIONNAIRES
SENT TO
RESIDENTIAL
SCHOOLS
JANUARY, 1981

1. Do you have a screening form or use a particular test for determining which students require training in listening skills?
Yes: 6 No: 19

Name of test:

Sequential Tests of Educational Progress-Listening
Durrell
Auditory Readiness
VISCO Auditory Perception Training Program
Auditory Perception Test
Hearing, as opposed to listening, is tested
Buhl Listening Curriculum

2. Do you have a curriculum outline or a teaching guide for improving listening skills? Yes: 13 No: 12

Name of guide:

*Step Listening Test

*APH Listen & Think 4

*Listening & Learning-Fearan Pub., Dev. Listening Skills-
Peek Pub., Letters & Sounds - Scott Forsman

*Listening: A Curriculum Guide for Teachers of Visually
Impaired Students

*Materials compiled by media specialist

*Outline

*Educational Activities Listening Skills, APH Program
Scholastic also has a program which we have recently
looked at that looks good

*We use several different ones-depends on student needs,
teacher preference

*Effective Communication-Argus Comm. Tapes, How to Study &
Why-FL. State Dept. Ed.

*School curriculum guide

*Listening guides as included in Language Arts Curriculum

*Listening F/T Visually Impaired by Stocker-Chas. C. Thomas
Publisher

*SRA Listening Language Labs

3. Do you teach some students to use compressed speech devices?
Yes: 3 No: 25

4. Do you use the TSI Game Center for improving listening skills:
Yes: 4 No: 25

This questionnaire was sent to thirty university training programs for teachers of the visually impaired. Eleven have replied. The following is a summary of their responses.

1. Do you have any compressed speech devices? Yes: 3 No: 8
2. Do you have a screening device for determining potential users?
Yes: 0 No: 10
3. Do you have a training manual or a list of teaching objectives for using compressed speech devices? Yes: 0 No: 8
4. Do you have a screening form or would you suggest a particular standardized test for determining which visually impaired students require training in listening skills? Yes: 0 No: 9
5. Do you have a curriculum outline or a teaching guide you suggest for improving the visually impaired student's listening skills?
Yes: 3 No: 6

SUMMARY OF
RESPONSES
QUESTIONNAIRES
SENT TO
UNIVERSITY
TRAINING
PROGRAMS
JANUARY, 1981

ACCELERATED SPEECH: speech in which the word rate has been increased.

COMPRESSED SPEECH: speech that is reduced in length of presentation.

COMPRESSED SPEECH DEVICE: machine that enables adjustment of speed of tape or recording and eliminates the "chipmunk" sound at higher speeds.

LIBRARY OF CONGRESS CASSETTE PLAYERS: four track dual speed cassette players. These players are available on loan to registered borrowers of the National Library Service for the Blind and Physical Handicapped.

RECORDINGS FOR THE BLIND: a non-profit voluntary organization which provides recorded, educational books on loan to individuals who cannot read normal printed material because of visual, physical or perceptual handicaps.

Bischoff, R.W. Listening: A Teachable Skill for Visually Impaired Persons. Journal of Visual Impairment and Blindness. 1979 , 7 (2), 59-65.

This article presents a review of the literature on listening skills, a method for teaching listening skills in a sequential manner, and an overview of compressed speech and accelerated speech.

Research on listening for the visually handicapped revealed the following: braille and large print reading rates are considerably lower than sighted children's reading rates, thus making recordings a quicker method of obtaining information. Students who receive training in listening skills showed significant gains in listening comprehension compared to those who did not receive training. One study found recall was higher for compressed speech as compared to another type of speeded speech. Active participation while listening increases learning; auditory learning is more effective for subjects who have low IQ's and low braille reading comprehension.

In summarizing, the author states that listening skill instruction is essential for the visually handicapped student, and this instruction should be provided in a sequential manner.

Bradmueller, W.G. Speed Listening and Reading. Paper presented at the Annual Meeting of the Great Lakes Regional Conference of the International Reading Association, Cincinnati, 1978. (ERIC Document Reproduction Service No. ED 167 953)

The uses of compressed speech and types of speeded listening devices are discussed. Listening and reading as a means of learning are compared.

Research was done on 4th through 8th grade children in northern Illinois schools. An experimental group of children was taught specific academic units auditorily. The control groups learned the same units visually and auditorily. Test results at the end of study were compared. In general, the results indicated that children learn as well by listening as reading: there is a significant relationship between reading speed and listening speed. The combining of an auditory with a visual presentation shows promise for helping students with learning problems. Still another finding showed that teachers were generally enthusiastic about compressed speech techniques after using them.

Foulke, E. Impact of Science and Technology on the Early Years. Journal of Visual Impairment and Blindness, 1981, 75 (3), 101-108.

Reviews the contributions of technology towards the communication and mobility needs of the severely visually impaired. The technology discussed includes paper braille and computer braille production, paperless braille, reading by listening and compressed speech, tangible graphic displays, and electronic travel aids. The importance of early experiences in the visually impaired child's life is emphasized. The potential use of technology can only be realized through thorough preparation of the person who will use the technology.

Foulke E. and Sticht, T.G. Review of Research on the Intelligibility and Comprehension of Accelerated Speech. Psychological Bulletin, 1969, 72 (1), 50-62.

This paper reviews the research on the communication problems produced by the time compression of speech. Techniques for the acceleration of speech are described, methods for its evaluation are reviewed, and the factors that effect the comprehension of the speech are discussed.

Inhat, M.A. The effect of listening drills utilizing compressed speech and standard speech upon the listening comprehension of second grade children. CRCR Newsletter, 1976, 10 (3), 3.

A brief description of a study to determine if the listening skills of second grade students could be improved through compressed speech training. The Durrell Listening Test was used for pre and post-testing. The results showed no evidence that would indicate a gain in listening skills by presenting stories at a faster than normal speaking rate (200 wpm compared to 150 and 140 wpm).

Kuperberg, A. Some Relationships Between Listening Comprehension and Rate of Presentation. (M.Ed. Thesis) New Brunswick, NJ: Rutgers, the State University of New Jersey, 1975. (ERIC Document Reproduction Service No. ED 110 919)

This study was conducted to explore the relationship between listening comprehension and the rate of presentation. A review of the literature on listening is included.

The subjects in this study were 103 sixth grade students in a central New Jersey school district. Listening tasks were presented at rates of 75 wpm, 150 wpm, and 225 wpm.

In general, the results indicated that sixth grade students were better able to comprehend material presented at 75 wpm compared to presentation rates of 150 wpm and 225 wpm, regardless of reading ability. A significant positive correlation between listening and reading comprehension was found.

Levine, S.J. An Examination of Listening Rate. Auditory Learning Monograph Series 1, July 1974. (ERIC Document Reproduction Service Ed No. 102 749)

This study examines listener preference for rate of presentation of recorded material. The author begins this report with a discussion on the advantages and disadvantages of reading versus listening. One of the advantages of reading compared to listening is the reader's ability to increase or decrease the reading to his own preference or ability. With the advent of compressed speech devices, listeners may now have that same advantage.

The subjects in this study were 48 third, fourth, and fifth graders. They each listened to a story divided into four segments, each segment presented at a different rate. Students were able to vary the rate of each segment. It was found the students did show preference for a rate of listening. The findings also showed that individual students showed a wide variance of preference rates in their listening tasks.

Morris, J.E. Adaptation of the Durrell Listening- Reading Series for Use with the Visually Handicapped. Education of the Visually Handicapped, 1976, 8 (1), 21-27.

At a 1973 meeting of psychologists at the American Printing House for the Blind, the Durrell Listening-Reading Series was one of the tests recommended for adaptation for use with visually impaired children. A brief description of the test is given.

A study was then conducted to determine which grades or reading levels of visually impaired children would be appropriate for use of the Primary level of the Durrell. This study, as well as the adaptations of the test, were described in detail. The results of the study indicated that pupils reading at second and third grade levels should have

little difficulty with the Durrell, and that most students at a first grade reading level will be able to use it.

All levels and forms of the Durrell are now adapted in large print and braille, available through the American Printing House. Test directions were also adapted. Since all tests themselves are indetical in content to the original, the forms contained in the manual provided by the test publisher are appropriated for use with the adapted editions.

Musial, D. and R. Maple, The Influence of Compressed Speech Upon Reading, Listening, and Verbal Comprehension. Illinois School Research, 1975, 12 (1), 43-48.

A study was undertaken to determine if improvement in reading, listening, and verbal comprehension could be achieved through the use of compressed speech during six weeks of language arts classes. The students were 96 eighth graders with average IQ's and without any gross auditory or visual defects. After six weeks of language arts classes, the experimental group (who listened to taped stories at a speeded rate) was compared to the control group. The Durrell Listening and Reading tests were given to each group.

In general, the results of the study were not significant. The boys, in the experimental group, however, did perform significantly better than their counterparts in the control group.

Recommendations for further research are given.

Myers, J.A. Compressed Speech Increases Learning Efficiency. Education of the Visually Handicapped, 1978, 10 (2), 56-64.

The purpose of the study was to examine the relationship between different rates of compressed speech and learning efficiency. The study also sought to determine the relationship of other variables, such as intelligence, age, and sex, on the learning efficiency of compressed speech. The subjects in this study were 35 students in the ninth through twelfth grades enrolled at the West Virginia School for the Blind.

The students listened to prerecorded selections taken from the STEP Test at compressed rates of 180, 220, 262, and 302 words per minute, and were then given a short comprehension test. The students re-listened to the tape or parts of the tape until they were able to achieve 100% accuracy on the comprehension check. A learning efficiency score was computed from the time required to reach the 100% criterion. A comprehension check given 24 hours later was given to determine recall.

Though there were many limitations to this study, as discussed by the author, the findings did indicate that compressed speech offers a means of increasing learning efficiency. Those students who listened to the higher rates (262 and 302 wpm) of speech, higher learning efficiency scores than those listening at the two slower rates. The factors of age, intelligence, grade, and base comprehension level proved insignificant in the determination of learning efficiency.

Stallings, G. Listening Games. Chicago: Cornet Instructional Media, 1974.

Listening Games is a series of 10 games on cassettes with large game cards which the student uses independently. Game cards are laminated so that crayon marks can be wiped off. Game directions are on the cassette and the beginning directions are in large print on the reverse side of the game card. Pictures are large and clear enough for use with most large print readers.

The games provide practice in many skills, including the following:

- identifying sound sources
- comparing likenesses and differences in sounds
- recognizing rhythmic patterns and rhyming words
- describing action sequences from its sounds
- identifying emotions by sounds
- following directions, making judgments, problems solving, and many other skills

A teacher's manual is included.

Listening Games is appropriate for partially sighted children in the primary grades. Adaptation of game cards would be needed for severely visually impaired children or for braille readers.

Rawls, R. Program of Training in Listening - Reading for Visually Impaired Students Using Compressed Speech Recordings. In E. Foulke (Ed.), Proceedings of the Second Louisville Conference on Rate and/or Frequency Controlled Speech. Louisville: Center for Rate-Controlled Recordings, Perceptual Alternatives Laboratory, University of Louisville, 1971. (ERIC Document Reproductive Service No. ED 061 682)

This study examined the assumptions that reading by listening is a language skill involving certain cognitive processes, that these processes are related to listening and reading in other situations, and that improvement should result from training. It also examined the assumption that the use of compressed speech in a training program would increase both reading speed and listening speed of compressed and uncompressed speech after instruction and practice.

The subjects in this study were blind and partially sighted students at the Governor Moorehead School for the Blind in North Carolina. There were 47 students from the 10th, 11th, and 12th grades. The students were divided into four groups; each group went through a different listening training program. In general, the results of the study indicated the assumptions of the author. The results also indicated that listening technique training followed by practice using compressed speech as an aid is an efficient method for improving listening - reading skills. Advantages of the different training programs used are discussed.

Teach, J.K. The Effects of Rate Controlled Speech on the Listening Comprehension of Learning Disabled and Normal Children. Paper presented at the Annual International Convention, The Council for Exceptional Children, Dallas, April 1979. (ERIC Document Reproduction Service No. ED 170 993)

This study explores the difference in the abilities of learning disabled students and regular students to perform on listening tasks. The subjects in this study were 39 white, middle socioeconomic status boys between the ages 6 to 8.11 years. The listening tasks under study were: auditory discrimination, vocabulary listening, sentence listening, and the ability to comprehend stories at altered speech rates of 0.5, 1.9, and 1.5.

In general, the results of the study indicated there were no significant differences in abilities to perform on the assessment tests of auditory discrimination and sentence listening. There was significant difference found in vocabulary understanding. Furthermore, there were no significant differences in their abilities to comprehend stories at the altered listening rates of .5 and 1.0. For the normal population, the slow rate (.5) of presentation resulted in the greatest error frequency. For the learning disabled, the

fast rate (1.5) of presentation was most difficult.

The very limited population of this study should be considered when reviewing the results.

Woo, T.A. Patterns of Listening and Reading Skills in Visually Handicapped Students. Journal of Visual Impairment and Blindness, 1981, 75 (5), 215-218.

The purpose of this study was to determine the variables which affect the development of listening and reading skills of visually handicapped students. Students selected for the study were fourth through sixth graders from four residential schools for the visually impaired. The 71 subjects had no additional handicaps.

The assessment instrument for determining listening and reading skills was the Durrell Listening-Reading Series, which is adapted for visually impaired. The predictor variables under study were: intelligence, grade level, chronological age, socioeconomic status, visual acuity, mode of reading, and sex.

In general, the findings indicated that intelligence was the strongest predictor of both listening and reading skills. The subjects demonstrated stronger listening skills regardless of age, grade or visual impairment. The other variables under study lacked predictive value for determining listening or reading performance.

Bischoff, R. W. Listening: A Teachable Skill for Visually Impaired Person. Journal of Visual Impairment and Blindness. 1979, 7 (2), 59-65.

Bradmueller, W. G. Speed Listening and Reading. Paper presented at the Annual Meeting of the Great Lakes Regional Conference of the International Reading Association, Cincinnati, 1978. (ERIC Document Reproduction Service No. ED 167 953)

Foulke, E. Impact of Science and Technology on the Early Years. Journal of Visual Impairment and Blindness, 1981 75 (3), 101-108.

Foulke E. and Sticht, T.G. Review of Research on the Intelligibility and Comprehension of Accelerated Speech. Psychological Bulletin, 1979, 72 (1), 50-62.

Kuperberg, A. Some Relationships Between Listening Comprehension and Rate Presentation. (M.Ed. Thesis) New Brunswick, NJ: Rutgers the State University of New Jersey

Levine, S. J. An Examination of Listening Rate. Auditory Learning Monograph Series 1, July 1974. (ERIC Document Reproduction Service No. ED 102 749)

Morris, J. E. Adaptation of the Durrell Listening - Reading Series for Use with the Visually Handicapped. Education of the Visually Handicapped, 1976, 8 (1), 21-27.

Musial, D. and R. Maple, The Influence of Compressed Speech Upon Reading, Listening, and Verbal Comprehension. Illinois School Research, 1975, 12 (1), 43-48.

Myers, J.A. Compressed Speech Increases Learning Efficiency. Education of the Visually Handicapped, 1978 10 (2), 56-64.

Stallings, G. Listening Games. Chicago: Cornet Instructional Media, 1974.

Rawls, R. Program of Training in Listening - Reading for Visually Impaired Students Using Compressed Speech Recordings. In E. Foulke (Ed.), Proceedings of the Second Louisville Conference on Rate and/or Frequency Controlled Speech. Louisville: Center for Rate-Controlled Recordings, Perceptual Alternatives Laboratory, University of Louisville, 1971. (ERIC Document Reproductive Service No. ED 061 682)

Teach, J. K. The Effects of Rate Controlled Speech on the Listening Comprehension of Learning Disabled and Normal

OPTACON
TYPEWRITER
ATTACHMENTS

F3A
TYPEWRITER
ATTACHMENT



F5A
TYPEWRITER
ATTACHMENT



Photographs courtesy of
Telesensory Systems, Inc.

Figure 7
Optacon Typewriter Attachments

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The Optacon is a device that converts the image of a printed letter or symbol into a tactile form that can be felt with one finger. To read with the Optacon the student moves a miniature camera across a line of print with his right hand. The index finger of the left hand is placed on the Optacon's tactile array, which is approximately $1\frac{1}{2}$ inches long and 1 inch wide. As the camera is moved across the letter the image is reproduced on the tactile array by vibrating rods. Whatever print image is viewed by the camera's lens is thereby felt by the student. All of our braille reading students are taught to use the Optacon. The Optacon lens typewriter attachment is an Optacon accessory. This attachment allows the Optacon student to proofread, make corrections, locate typing position following interruptions, and fill in information on pre-printed forms using a typewriter.

Typewriter Lens Module F3A is available for the electric IBM Model D, and the SCM Coronamatic 2500.

Typewriter Lens Module F5A is designed to fit the IBM Selectric II and Selectric III typewriters and the IBM Mag Card word processing machines which have IBM Selectric II typing units.

The Optacon has been available for approximately ten years. The importance of systematic training was recognized by the manufacturer of the Optacon and provided. As early as 1972, encouraging results of students reading with the Optacon were reported. Six students received instruction from a trained teacher at an elementary school during the spring of 1970. By summer it was reported that five of the students were able to read at better than 40 words per minute (Linville, 1973). Five high school students who were instructed from October 1971 through July 1972 attained a mean rate of 39 words per minute with a standard deviation of 13 words per minute. In 1976, the Bureau of Education for the Handicapped supported teacher training efforts by investing four million dollars to purchase Optacons and to train teachers. As of 1980, a total of 628 teachers had trained 1,600 students. (Gutknecht, 1980).

As a consequence of the above activities, much material has been developed to assist in teaching reading with the Optacon, e.g. Telesensory Systems Inc. Training Manuals, American Institute for Research Manuals, etc. A logical extension, having educational and vocational implications, is to provide systematic instruction in the use of the accessory lens modules, particularly the typewriting module. There are indications which strongly suggest that an individual who can not only read with the Optacon but who is also proficient in the use of accessory lens modules will be more efficient in school and later when seeking employment. There are also indications that an individual, while not being a particularly proficient reader, (i.e. a rate of less than 30 words per minute) could still use the typewriter lens module advantageously.

A research study on the effectiveness of the Optacon Typewriter Lens Module F3A was conducted by Alicia R. Kauffman from the Overbrook School for the Blind in Philadelphia, Pennsylvania in May of 1975. The goal of this study was to develop an instructional package whereby blind typists could proofread and correct typewriting errors.

A survey given to recent graduates from Overbrook who had completed the Office Skills and Transcription courses showed that totally blind students considered "inability to proofread" as a major drawback for them when hired. They felt that although they had skills, they were not "completely independent" of a sighted person.

At the conclusion of their research it was found that the F3A as a instructional tool did increase typewriting accuracy, and allowed blind typists to proofread and correct mistakes. The typewriting speed of the Optacon user is not inhibited or decreased as a result of using the F3A. Typewriting ability, intelligence and Optacon training are the best indicators of success.

ADVANTAGES/DISADVANTAGES & POTENTIAL USERS

Through use of the attachments, typewriter accuracies increase.

Allows the totally blind typist to correct and proofread all of his own typing.

The attachment lens are great for teaching prevocational skills.

Finding typing position after losing place.

Filling out forms (using correct spaces).

Proper alignment on focus when using a key sheet.

ADVANTAGES OF THE OPTACON TYPEWRITER ATTACHMENTS

Restrictive single typewriter use.

Some students have difficulty adjusting it. Even with maximum adjustment, image is not as easily read as with the standard camera.

Complexity of F5A set up.

F5A attachment is bulky and cumbersome.

DISADVANTAGES OF THE OPTACON TYPEWRITER ATTACHMENTS

Reads braille exclusively, not print readers.

Good typewriting ability. (Also, can be used as a part of a typing course)

Good manual dexterity and spatial skills.

High motivation to improve their typewriting accuracy.

Optacon Training.

Intelligence.

Good tactile perception skills.

Ability to use equipment.
(If using complex typewriter)

POTENTIAL USERS OF OPTACON TYPEWRITER ATTACHMENTS

This screening is designed to assist in the determination of the use of Optacon typewriter attachments lens.

Student Name _____

School _____

Grade _____

Date of Birth _____

1. Is student able to independently use and operate a typewriter?

_____ words per minute student can type

2. Is student able to identify upper and lower case letters in serif and san serif type with the Optacon?

3. Is the student able to self correct typing? If so, what method does student use?

4. Braille reading speed.

_____ words per minute

5. Optacon reading speed. (speed is not critical, can be a very slow Optacon user)

_____ words per minute

6. Comments (include vocational implications, motivation, etc.)

7. Recommendations:

Evaluator _____ Date _____

1. Camera

Retina module is located in the receptacle on the left side of the F3A.

2. Adjustment Controls

- a. Vertical adjustment is top control knob. It will move character position one-half letter space on the Optacon array.
- b. Horizontal adjustment control is the lower knob.
- c. Magnification Adjustment
This zoom control increases the image size. There is the same relationship between threshold and magnification as with the regular lens.

3. Power Supply

The F3A uses the Optacon battery charger.

4. Mounting Fixture (located in middle on typewriter cover)

The F3A attachment screws firmly into the mounting fixture.

5. Light Adjustment (ring located on top barrel)

This slides forward and backward to adjust the distance between the light shield and the page. It should be forward for reading.

6. Top Barrel

This provides light to typing surface.

7. Light Shield (located at front end of the barrel)

It directs light toward the last character typed, if adjusted horizontally to look at that letter.

8. Cylindrical Opening (located on the left side of F3A.)

This opening is identical to the receptacle on Optacon camera and accepts the Optacon retina.



Figure 8

Photographs courtesy of
Telesensory Systems, Inc.

1. Before mounting the F3A
 - a. Slide ring which moves the light shield back so it will not hit platen.
 - b. Position zoom lens ring all the way forward.
 - c. Set both vertical and horizontal adjustment controls to their center "null" position where there is least resistance and the knobs turn loosely.
2. With one hand grasp F3A so the barrels point toward the roller of the typewriter.
3. With your free hand, locate the pre-mounted fixture; place F3A onto the mounting bracket.
4. The mounting screw should be aligned with the thread hole in the fixture.
5. Turn the thumbwheel clockwise with slight inward pressure until tight.
6. Release the retina module from camera by rotating counter clockwise until you feel it release.
7. Store standard lens module in your camera holder.
8. Insert the retina module into the receptacle on the left side of the F3A, with the cord up, twist to secure.

1. Turn on typewriter and insert a blank sheet of paper.

The Optacon's threshold and intensity controls will control the F3A. The zoom control is located on the lower barrel of the F3A.

2. Adjust the character position on the Optacon array.
3. Type several dashes on the page.
4. Backspace the typewriter two spaces.
5. Set threshold between 9-12 o'clock.
6. Using the vertical adjustment control (top control) rotate the knob until dash is vertically positioned in the center of Optacon array.
7. Space forward to blank area.
8. Type an upper case "E".
9. Using the horizontal adjustment control (lower knob) turn the control to the left or right until the "E" is centered on the array.
10. Make the final zoom lens and threshold adjustments so that the "E" appears with proper size and thickness.

*If F3A is correctly adjusted, the letter that appears on the Optacon array is the one that has just been typed.

1. Camera

Cylindrical, about 1½" in diameter. It slides along a metal rod attached to rectangular plates mounted on cover of typewriter.

2. Magnification Adjustment (located on left side of camera)

This rotating cylinder increases the image size. There is the same relationship between threshold and magnification as with the Optacon. An increase in size increases thickness of image. The magnification is increased when adjusted away from use.

3. Camera Pointer (located below the camera)

Indicates the type element position. It can be adjusted vertically by sliding it in or out. It is used to slide the camera along the rod.

4. Power Cord

Coiled elastic cord connected to camera that extends to the left end of the rod. This coiled cord connects by a phone-jack type plug to a power supply.

5. Power Supply

Box that converts 110v current for use of the F5A attachment. It can be plugged into any three hole grounded socket.

6. Mounting Plates (located on each end of the rod)

Aluminum mounting templates used to position and mount the F5A lens on the typewriter.

7. Mounting Template, Mounting Brackets

The aluminum template and two stainless steel brackets are used to position and mount F5A lens on the typewriter.

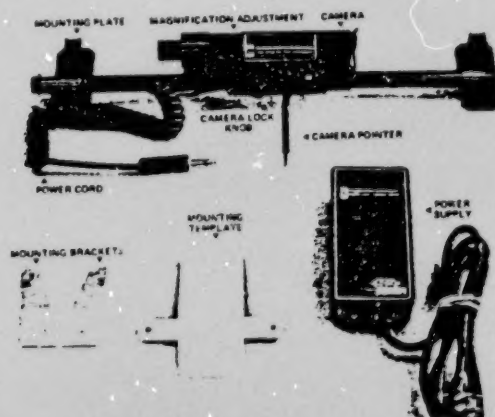


Figure 9

Photograph courtesy of
Telesensory Systems, Inc.

MOUNTING F5A

1. Attach mounting template to typewriter.
2. Attach mounting brackets using template.
3. With camera locked on rod, mount F5A attachment onto brackets, attach right side first.
4. Attach retina to module with the cord at 12:00.
5. Plug attachment cord into power supply box.
6. Plug box into electrical socket.

ADJUSTMENTS F5A

1. Starting at the left margin type an "E", then a line of dashes ending with an "E" at the right margin. Move the typeball out of the way.
2. Set threshold at approximately 9:00. Move camera to the right to locate the line of dashes and the letter "E" at the right margin.
3. Adjust knob on right for gross adjustments of vertical image.
4. Slide camera to the left along the line of dashes and locate the letter "E" at the left margin.
5. Adjust knob on left to make fine adjustment of vertical image.
6. Type one letter on blank area of line.
7. Align attachment pointer with ball indicator.
8. Type a line, read and correct errors.

*The teacher may want to refer to TSI F5A manual for clarification of mounting and adjustments.

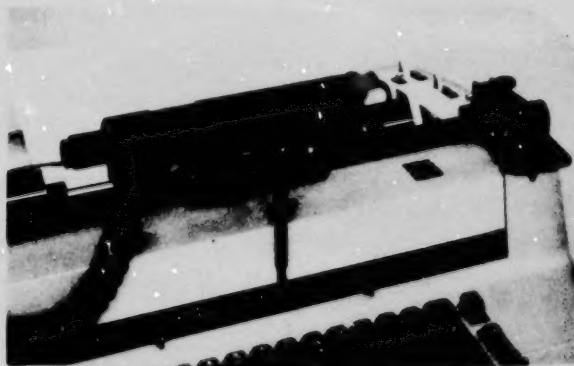


Figure 10

Photograph courtesy of
Telesensory Systems, Inc.

1. The teacher needs to feel very comfortable operating the Optacon and the attachments.
2. For the first session the teacher should have the attachment set up and focused. The teacher should demonstrate to the student how to adjust the thickness of the imprint and the focusing of the letter on the tactile array. The teacher should also make sure that the student is familiar with the type of print from the particular typewriter he will be using.
3. The teacher should demonstrate mounting and the use of attachment. When using the F3A, the camera should be positioned over the last typed character, if mounted correctly.
4. It is necessary to manually move the F5A pointer when the F5A is used to position the camera over the desired character.
5. When using the F3A, the student needs to be able to use the Ko Recto Cartridge. In using the F5A, the student needs to understand that when he finds an error with Optacon, it should be adjusted so that student is looking at the last letter or error but ready to type; he presses the "correction key," (key automatically erases). He then types error again, and retypes correct letter.
6. The student should be instructed on the care and maintenance of lens attachments. The student should understand how to set up device, taking the retina from the Optacon plugging it into the F3A or F5A and also how to put equipment back properly in its storing position.
7. The student also needs to be aware that slight "out of focusing" may occur due to vibrations from the electric typewriter. He should know to alert the teacher as soon as possible when this happens.
8. The teacher needs to be aware that the student may experience difficulty with certain typing symbols (example, !, @, #, \$, %, &, *). Due to lack of these symbols in regular optacon training or reading experiences. These should be introduced prior to typing lesson.
9. Type bar should be clean. It is recommended that the pressure controls on electric typewriter be maintained at five (5). Fabric ribbons should be replaced often to insure good quality imprints (carbon ribbons are best).

10. In the initial stages of instruction, the student should be given typed sentences with errors, and use the typewriter lens attachment to locate the errors.
11. When two keys are struck simultaneously resulting in a blurred type, the student probably will be unable to read and correct with the correction key or slip in the cartridge. Therefore, it will be necessary to use liquid paper or white out .
12. The student should be discouraged from continually reading material with optacon. The student should use the optacon only when an error is suspected.
13. The teacher should note number of errors in the final copy on a number of occasions prior to introducing the F3A or F5A. This will provide baseline data that can be used to compare the number of errors in final copy with and without the typewriter lens attachment.
14. The teacher should retain all typewriter attachment packaging in case the unit needs to be returned for repair.
15. It is recommended that the teacher use taped or dictaphone typing lessons.
16. If necessary, proofread copy before removing from typewriter. Proofreading will be an easier task with the F3A.
17. The lens attachment should remain mounted, as frequent removal and remounting requires readjustment of position focus.
18. If the student will be typing on printed forms, it will be necessary to become thoroughly familiar with the format before inserting in typewriter and again before typing. This will allow the student to determine typing position on the typewriter.
19. Letter recognition quizzes of "type face", number, and punctuation marks should be periodically given to increase students' speed in correcting.
20. Time should be given for proofreading at the end of an assignment, the teacher should emphasize accuracy and not speed.
21. Once the student has gained a fair degree of proficiency, he/she should be encouraged to use the device for actual classroom assignments.
22. In timed writing for determining accuracy, the student should not be allowed to make corrections.

The teacher may elect to use the goal statements on the following skills checklist. This will assist in writing annual goals and accompanying short term objectives. The tasks have been broken down in the following manner:

1. setting up equipment
2. proofreading typed copy

Sample goals and short term instructional objectives are included. The teacher decides when the various tasks would be presented, breaks down the task into more discrete steps, decides upon criteria of mastery and anticipated dates of mastery; all based on individual needs of the student. The screening section page will describe the student's present level of performance. The skills checklist will identify specific areas of instruction.

The student will be able to set up F3A Optacon typewriter attachment.

F3A SKILL CHECKLIST

- _____ attach typewriter lens module to pre-mounted fixture
- _____ insert retina module into receptacle on left side of F3A
- _____ turn typewriter to "on" position
- _____ adjust character position on the Optacon array

The student will be able to proofread his/her typing.

- _____ will locate errors on type line
- _____ will erase errors using Ko Recto Cartridge
- _____ will insert correct letter
- _____ will fill out form

The student will be able to set up F5A Optacon typewriter attachment.

F5A SKILL CHECKLIST

- _____ attach typewriter lens module to brackets on typewriter
- _____ plug typewriter and lens module F5A power supply into wall outlet
- _____ correctly place Optacon camera retina to attachment
- _____ turn typewriter and optacon to "on" position
- _____ adjust magnification
- _____ properly align a letter

The student will be able to proofread his/her typing.

- _____ will locate errors on typed line
- _____ find last word typed
- _____ will erase errors and insert correct letter using lens module
- _____ will fill out form

SAMPLE

INDIVIDUALIZED EDUCATION PROGRAM

Student Name: Steven WonderDate: 10 / 1 / 82Area in which special education will be provided: use of Optacon typewriter attachmentSubject Area(s): typing and Optacon skillsPresent level of performance: Student has not previously used Optacon typewriter attachment; types approximately 15 wpm with 10 errors.Annual Goal: Student will type 30 wpm with typewriter attachment with less than 3 errors per page.Instructor(s): (1) Teacher/Vision Impaired (2)(3)

SHORT TERM INSTRUCTIONAL OBJECTIVES	EVALUATION OF SHORT TERM INSTRUCTIONAL OBJECTIVES		
	Criterion for Mastery	Eval. Procedures, Eval. Schedule	Results/Date
1. With Optacon typewriter attachment, student will type	15 wpm with less than 5 errors per page on 3 consecutive sessions.	teacher evaluation 11/15/82	
2. With Optacon typewriter attachment, student will type	20 wpm with less than 5 errors per page on 3 consecutive sessions.	teacher observation 2/15/83	
3. With Optacon typewriter attachment, student will type	25 wpm with less than 3 errors per page on 3 consecutive sessions.	teacher observation 4/15/83	
4. With Optacon typewriter attachment, student will type	30 wpm with less than 3 errors on 3 consecutive sessions.	teacher observation 6/10/83	
UNIQUE Methods <u>Optacon typewriter attachment; individualized instruction; typing</u> and/or Materials: _____			

Comments: _____

[illegible]

Figure 10
Student Record Sheet

1. Battery charger should be plugged in at all times, (only necessary with F3A).
2. The Optacon should be turned off while the lens modules are being charged. Otherwise serious damage to the electrical circuitry may result.
3. When problems with equipment arise, it is recommended that the teacher contact TSI Service before sending equipment to TSI.
4. The F5A lens attachment should remain mounted, as frequent removal and remounting requires readjustment of position and focus.

MAINTENANCE

As long as the service contract for the Optacon is maintained TSI will cover all maintenance and repair on all Optacon Typewriter Lens Attachments.

WARRANTY

Telesensory System Inc. is the only company that currently produces the Optacon lens attachments for typewriters.

CONSUMER
INFORMATION

	Model F3A	Model F5A
type of typewriters	movable carriage typewriters	movable - ball typewriters
	IBM Model D	IBM Selectric II
	SCM coronamatic 2500	Dual - Pitch Selectric
		Mag Card, Mag Card II & Mag Card A

The following is a summary of the responses received on a questionnaire sent to teachers of the visually impaired in the state of Florida. Of the 107 questionnaires sent, 46 responded.

SUMMARY OF RESPONSES
TO QUESTIONNAIRES
SENT TO FLORIDA
VISION TEACHERS,
1981

Do you teach Optacon reading? Yes: 16 No: 28

Do you have a screening form to determine which students will receive Optacon training? Yes: 3 No: 32

What training manuals do you use?

TSI Stage 1 & Stage 2 Manuals	<u>11</u>
TSI Optacon Materials for Children	<u>2</u>
TSI Automatic Page Scanner Manual	<u>2</u>
Materials adapted by teacher	<u>1</u>
Materials of interest to student	<u>1</u>

Any comments on the typewriter lens attachment?

Do not have one. 5
Haven't used it. 3
I would love to see one and train some of the kids with it.
Difficult at times - constant adjustment to fit size of print.
I'd like to know more about this.

The following is a summary of the responses received on a questionnaire sent to residential schools for the visually impaired in the United States, 1981. Of the 49 questionnaires sent, 31 responded.

SUMMARY OF RESPONSES
TO QUESTIONNAIRES
SENT TO RESIDENTIAL
SCHOOLS, 1981

Do you teach Optacon reading? Yes: 26 No: 4

Do you have a screening form to determine which students will received Optacon training? Yes: 13 No: 14

What training manuals do you use?

TSI	<u>16</u>
AIR	<u>5</u>
San Diego School - Title VB Student Manual for Optacon	<u>2</u>
OIM Manual	
Teacher made materials	

Any comments on the typewriter lens attachment?

*We use it. Seems restrictive-single typewriter use.
*I have observed its use, but have not myself taught with it.
*Excellent tool.
*We do not have the typewriter attachment at this time.

- *Some students have difficulty adjusting it. Even with maximum adjustment, image is not as easily read as with standard camera.
- *It worked particularly well with one student who was just learning how to type.
- *Good device for teaching prevocational skills.
- *We are presently using the F3A lens attachment-it is a great device! I will be using the F5A lens soon with another student.
- *Excellent for training but would probably prefer a different print style than that of the Smith-Corona Coronamatic 2200. It can be a really effective tool.
- *We use one as a part of our typing program.
- *We have the single letter attachment-but want the whole line scanner.

This questionnaire was sent to thirty university training programs for teachers of the visually impaired, 1981. Eleven have replied. The following is a summary of their responses.

Do you have a course in Optacon reading? Yes: 9 No: 2

Is it a part of a methods course? Yes: 3 No: 5

Do you have any screening devices for potential Optacon users?
Yes: 2 No: 5

What training manuals would you suggest for teaching Optacon?

Primary _____

Elementary _____

Secondary _____

SUMMARY OF RESPONSES
TO QUESTIONNAIRES
SENT TO UNIVERSITY
TRAINING PROGRAM,
1981

F3A CAMERA LOCK: knob found below the camera which locks the camera in place.

F3A HORIZONTAL CONTROL: moves camera from left to right.

F3A VERTICAL CONTROL: moves the lens up and down.

F5A CAMERA POINTER: the F5A pointer is aligned to the typewriter's pointer so that the F5A can be used to make accurate corrections.

F5A MOUNTING PLATES: holds the attachment securely onto the typewriter.

F5A POWER CORD: connected to the camera which supplies power to the attachment.

OPTACON: provides the visually impaired person with access to printed material. The full name, Optical-to-Tactile CONverter, implies the camera's ability to change print images into tactile vibrations.

OPTACON BATTERY: is contained within the main chassis of the Optacon. The five volt battery is rechargeable. When fully charged, this battery will run the Optacon for over four hours of normal use.

OPTACON BATTERY CHARGER: a rectangular unit with a plug on one side for electric power and a plug connector to the Optacon on the other. The battery can be recharged at any time using the charger.

OPTACON CAMERA: converts the print to electrical impulses which are felt on the tactile array.

OPTACON CAMERA CABLE: the pliable wire which connects the camera to the bottom right side of the Optacon.

OPTACON CAMERA HOLDER: the small plastic unit in which the camera is stored. The holder should be placed on the front edge of the Optacon when reading so that the camera may be secured if it is necessary to stop reading.

OPTACON CIRCUIT BREAKER: located on the top right-hand side of the tactile array compartment. This functions as a fuse and protects the battery and wiring from accidental power surges.

OPTACON INPUT/OUTPUT SWITCH: located on the side of the back panel, this connects the Optacon to the visual display or repeater cable.

OPTACON INTENSITY: the upper knob on the front panel of the Optacon with a ridge to indicate the setting of the strength of intensity of the vibrators on the tactile array, setting range 12:00 - 4:00.

OPTACON LEN MODULE: is top part of the camera, the lens records the image of the imprinted material.

OPTACON MAGNIFICATION: a sliding button located at the top of the camera. As the button is pushed away from the reader, the letter size becomes larger. As the button is pushed toward the reader, the letter size becomes smaller.

OPTACON NORMAL/INVERT SWITCH: a slide switch located on back panel. In the normal mode, dark print on white background is readable. In the invert mode, light print on a dark background is readable.

OPTACON ON/OFF SWITCH: a vertical sliding switch found on the right side of the front panel on the Optacon.

OPTACON RETINA MODULE: located at the bottom of the camera, the retina module can be removed by pushing in and turning simultaneously. The retina contains phototransistors.

OPTACON SOFT PACK: the soft vinyl carrying case provided with the Optacon. The adjustable straps accommodate several methods for transport and give maximum protection to the Optacon while being moved.

OPTACON TACTILE ARRAY: a rectangular shaped groove with 144 tiny holes found inside the Optacon. The left forefinger is placed on the array to receive the impulses or vibrations.

OPTACON THRESHOLD: the lower knob on the front panel which controls the thickness of letter strokes.

REPEATER CABLE: a short cord which connects two Optacons so that a teacher can work with two students simultaneously. This also allows a blind teacher to teach the use of the Optacon.

TRACKING AID: a plastic base with a rubber non-skid surface and raised sides. The guide holds the camera straight as the camera is moved from left to right.

TYPEWRITER LENS MODULE: is designed to allow the Optacon user to proofread, make corrections, locate typing position following interruptions, and fill in information on pre-printed forms.

VISUAL DISPLAY: is the unit used by the sighted teacher. It has six vertical columns and twenty-four horizontal rows of lights. These are equal to the number of vibrations which are felt on the tactile array. The sighted teacher is able to see the same pattern that the student is feeling, when the visual display is connected to the Optacon by a cable.

American Institutes for Research. Optacon Instructional Materials, Elementary Level. Palo Alto, CA: Author, 1973

This Optacon training manual was developed for use in grades four through eight. The teacher instructions and the student manual are separated. The format of the pages in the student manual are designed to allow the student independence in tracking and maintaining the place in the lesson.

In the first sections of the manual, the units are numbered and should be presented sequentially. These lessons introduce the student to the Optacon, teach upper and lower case letters, number, and also develop word attack skills. Practice is given in reading sentences.

The second section of lettered units can be presented in the order most appropriate for the particular student. The skills emphasized in these units include: tracking, "code-breaking," increasing reading speed, reading various type styles and formats, controls adjustments, and incorporating the Optacon into daily activities.

The type style of manual begins with sans serif and introduces a variety of styles in the latter units. Punctuation is introduced gradually throughout the lessons.

American Institutes for Research. Optacon Instructional Materials, Secondary Level. Palo Alto, CA: Author, 1973

This Optacon training manual was developed for use in grades nine through twelve. Its design is identical to the elementary level manual; only the vocabulary is changed to a more appropriate level for secondary students.

Bliss, J. An Optacon Program for Blind Children in Home and School. Menlo Park, CA: Sensory Aids Foundation, 1976.

Describes an Optacon program in the home and public school. Teacher training and student training is described. Four case studies of Optacon students are presented. Special teaching strategies for each student are discussed.

Bliss, J.C. & Moore, M.W. "The Optacon Reading System." Education of the Visually Handicapped, December 1974, pp 98-102

The history of the development of the Optacon is discussed. A description of the Optacon, its features and accessories, follows.

Goldish, Louis H., & Harry E. Taylor, "The Optacon: A Valuable Device for Blind Persons," The New Outlook, February, 1974.

An independent survey of the first 100 users of the Optacon. The survey included questions about the characteristics of the user, the uses of the device, advantages and disadvantages.

Lutz, G.W. "Optacon reading in the Public Schools. Equal Educational Opportunity for All the Visually Handicapped, Philadelphia: Association for Education of Visually Handicapped, 1974. Paper presented at the Association for the Education of the Visually Handicapped Conference, San Francisco, June 1974. (ERIC Document Reproduction Service No. ED 115 059)

This paper reports on the San Diego City Schools Optacon project (EHA Title VI) for developing methods and materials for use in teaching school age children to read with Optacon. Teacher and student training manuals were developed.

Included in this report are the following topics: learning sequence for elementary and secondary students, problems that may affect Optacon learning, teacher preparation, and suggestions for future research.

Jacobsen, L. Pupil Optacon Workbook. Venice, CA: Author, Undated.

This workbook is designed for beginning Optacon skills. The pages are in print and in braille. Thermoform pages are provided for upper and lower case letters, numbers, and various other symbols.

The workbook begins with a brief description of the Optacon and ends with practice lessons for use once the student has mastered the letters of the Optacon. Available from: Linda Jacobsen, 423 28th Avenue, Venice, CA 90291

Pennsylvania Materials Center for the Visually Handicapped. A Curriculum Guide for the Instruction of Reading with the Optacon (2nd Reprint). Harrisburg, PA: Author, 1980.

This guide was developed as a supplementary instructional manual for teaching Optacon to school age students. It can be used in conjunction with the TSI manuals.

The curriculum guide is presented in unbound form so that it could be placed in a notebook. The teachers guide is separate from the students' lesson pages. It is printed in sans serif type only.

Unit I, "Phonetic Analysis" is designed to be used supplementary to the character recognition lessons in the TSI Stage One Training Manual.

Unit II, "Syllabication," is designed for use after the student has learned to identify the entire upper and lower case alphabet and has begun contextual reading.

Unit III, "Language Patterns," is designed to develop an awareness of language patterns in order to help the student anticipate upcoming words when reading text.

Available from: Pennsylvania Materials Center for the Visually Handicapped, 4400 Franklin Street, Harrisburg, PA 17111

Pennsylvania Materials Center for the Visually Handicapped.
Focus on Individualized Programming for the Visually Handicapped, Part III. Harrisburg, PA: Author, 1978.

One section of this curriculum guide focuses on Optacon skills. The goals and objectives for a complete Optacon training program are given. There are six main goals:

1. To assist the student to learn Optacon equipment and operation
2. To assist the student to read capital manuscript letters and common punctuation signs
3. To assist the student to read lower case manuscript letters and numbers
4. To assist the student to use Optacon skills for daily and practical living skills
6. To assist the student to use Optacon reading skills for career education

Sequenced objectives are listed under each goal. This would be helpful in designing individual long-range programs and writing IEPs.

Telesory Systems, Inc. Optacon Instructional Materials for Children. Palo Alto, CA: Author, undated.

Part I Optacon Instructional Materials is prepared by American Institutes for Research.

The Primary Level is designed for children who are just beginning to read. The whole word pattern recognition approach is used. The lessons are coordinated with Harper & Row's Basic Reading Program.

The Elementary Level (grades 4-8) is for children who have basic Optacon reading skills.

The Secondary Level (grades 9-12) gives practice exercises in reading different typefaces and formats. The exercises are designed to be done by the student with minimal supervision.

Part II Materials for Beginning Readers is prepared by Mary Moore, Ph.D., Pittsburgh, PA.

The lessons in this part begin with pre-Optacon reading skills, such as: equipment operation, perceptual skills, identifying shapes, tracking practices. Nine upper case letters are presented. Simple sentences using learned letters are given for practice. The same nine letters are then introduced in lower case. Paragraph reading is used for practice. The remainder of the alphabet is introduced one letter per lesson with progressively longer reading selections. The major part of these lessons is in san serif type with some serif type shown.

This manual is presented in a three ring notebook with teacher instruction included.

Available from Telesensory Systems, Inc.

Telesensory Systems, Inc. Optacon Training Stage I, Grapheme Recognition, Teachers Edition (Rev. ed.). Palo Alto, CA: Author, 1975.

This manual presents a series of lessons for beginning Optacon training. It was developed for use by persons of all ages, interests and abilities.

Upper case letters are introduced before lower case. Different type styles are shown.

This manual is presented in a three ring notebook format. A separate student notebook is used.

Available from Telesensory Systems, Inc.

Telesensory Systems, Inc. Optacon Training - Stage II, Text for Speed Building, Introduction to Printed Formats (Rev. ed.). Palo Alto, CA: Author, 1973.

Section I, Text for Speed Building, is designed for practice in independent reading of various formats. It includes the following five chapters:

Short Stories
Well-known Readings
Poems and Songs
Bible Passages
Newsprint

Section II, Introduction to Printed Formats, can be read independently but teacher guidance is suggested. Students are exposed to a variety of printed formats and type styles. The following chapters are in this section:

Printed Format
Checks and Bank Statements
Charts, Tables, and Questionnaires
How to Use a Dictionary
Math Symbols

This manual is presented in a three ring notebook. Instructions to the teacher are included.

Available from Telesensory Systems, Inc.

Telesensory Systems, Inc. Optacon Training Teaching Guidelines (Rev. ed.). Palo Alto, CA: Author, 1977.

This book is a teacher's resource for all aspects of optacon training. A brief description of each section follows:

Introduction - includes the history and description of the Optacon.

Organization for training - explains different training models, recommended equipment, and recordkeeping procedures.

Equipment - describes and explains functions of equipment, checkout procedures, equipment malfunction checklist, and repair procedures.

Finger position - techniques and problem solving.

Controls and adjustment - teaching techniques.

American Institutes for Research. Optacon Instructional Materials, Elementary Level. Palo Alto, CA: Author, 1973

American Institutes for Research. Optacon Instructional Materials, Secondary Level. Palo Alto, CA: Author, 1973

Blanche, E. and A. Cook, Monster Reading Series. Los Angeles: Bowmar/Noble Publishers, Inc., 1976.

Bliss, J. An Optacon Program for Blind Children in Home and School. Menlo Park, CA: Sensory Aids Foundation, 1976.

Bliss, J.C. and M. W. Moore, "The Optacon Reading System." Education of the Visually Handicapped, December 1974, 6, 98-102

Boldish, Louis H., and Harry E. Taylor, "The Optacon: A Valuable Device for Blind Persons," The New Outlook, February, 1974.

Jacobsen, L. Pupil Optacon Workbook. Venice, CA: Author, Undated.

Pennsylvania Materials Center for the Visually Handicapped. A Curriculum Guide for the Instruction of Reading with the Optacon (2nd Reprint). Harrisburg, PA: Author, 1980.

Pennsylvania Materials Center for the Visually Handicapped. Focus on Individualized Programming for the Visually Handicapped, Part III. Harrisburg, PA: Author, 1978.

Telesensory Systems, Inc. Optacon Instructional Materials for Children. Palo Alto, CA: Author, Undated

Telesensory Systems, Inc. Optacon Training Stage I, Grapheme Recognition, Teachers Edition (Rev. ed.). Palo Alto, CA: Author, 1975.

Telesensory Systems, Inc. Optacon Training - Stage II, Text
for Speed Building, Introduction to Printed Formats (Rev. ed.).
Palo Alto, CA: Author, 1973.

Telesensory Systems, Inc. Optacon Training Teaching Guide-
lines (Rev. ed.). Palo Alto, CA: Author, 1977.

THE VERSABRAILLE™ SYSTEM

A PAPERLESS BRAILLE DEVICE

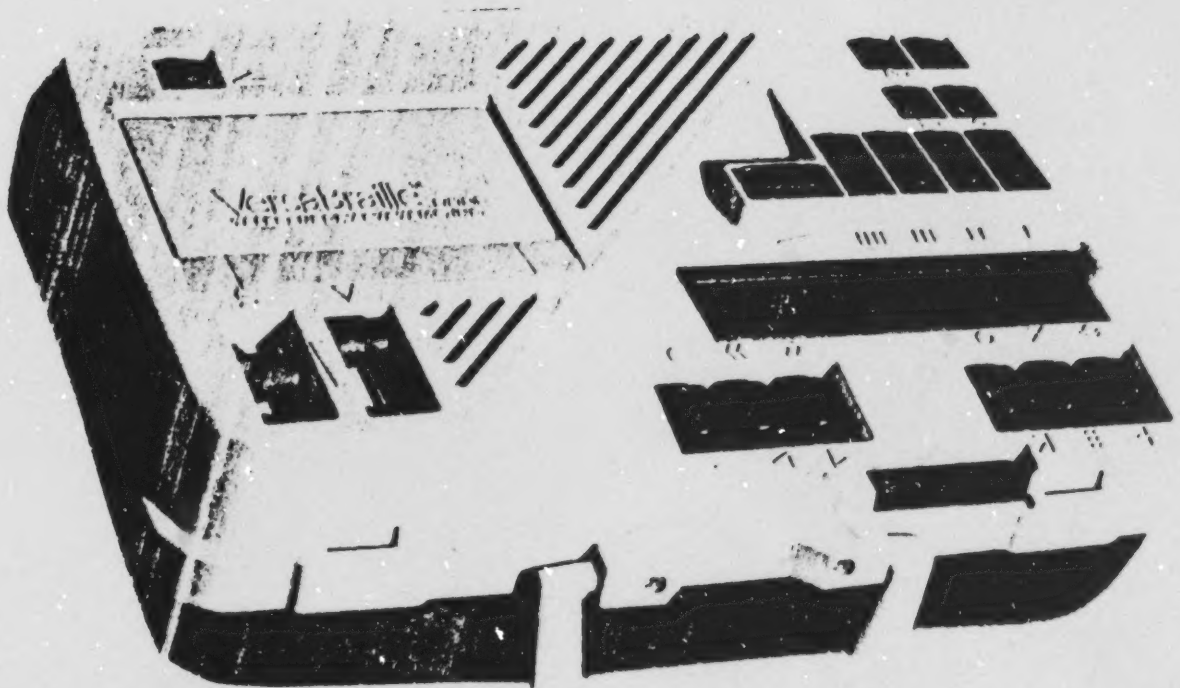


Figure 11
VersaBraille

Photographs courtesy of
Telesensory Systems, Inc.

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The VersaBraille is produced by Telesensory Systems, Inc. in Palo Alto, California.

The most significant advantage to the VersaBraille is its ability to record and organize braille into separate chapters and pages for simple, logical organization of materials. One can automatically locate any chapter, page, word, phrase or braille character anywhere on the page. This is a very important feature as the biggest drawback to tape recorders (either audio or braille) is finding the material.

If a word will not fit at the end of the display line, the VersaBraille system will automatically carry the word over to the following line rather than splitting it and possibly confusing the reader.

The average search time for a word in the VersaBraille system within a page is less than 2.5 seconds. Search for other pages on the tape is more than that and can be as great as 20 seconds if you ask for the last page in the last chapter.

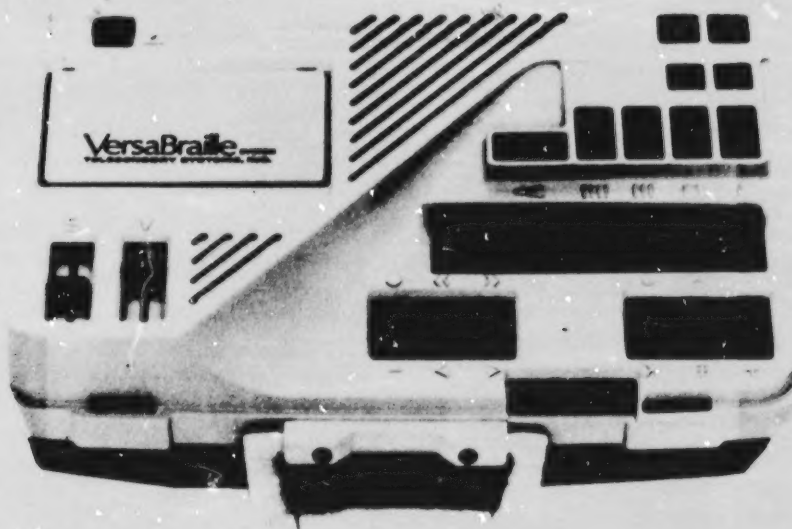


Figure 12
VersaBraille

Photograph courtesy of
Telesensory System, Inc.

Due to its recent introduction, very little research has been done with paperless braille. Bourgeois and Ashcroft (1979) compared reading rates with and without the Digicassette and found lower reading rates with the paperless braille machine than with standard braille. Possible reasons include a limited twelve braille cell display, inability to use two hands while reading, words interrupted at the end of the display causing confusion.

Two of the possible inadequacies of the Digicassette have been eliminated by the VersaBraille. A twenty braille cell display extends the reading "window" and words are not interrupted at the end of the display.

In 1979, the Virginia Commission for the Blind initiated an evaluation of paperless braille. Project REB (Reading Electronic Braille) concluded that paperless braille would be most beneficial as a media for instructional materials, particularly at the secondary level. As braille is presently published; its bulk, transcription and duplication time make it an unwieldy medium.

Several paperless braille devices (VersaBraille, Digicassette, Braillex) are able to store information on small cassettes (C-60) and present it in braille form on actual displays ranging from 12 to 20 braille cells in length. These devices all have keyboards for entry of information.

ADVANTAGES

1. The electronic keyboard allows quieter, faster and less-fatiguing braille writing.
2. Automatic retrieval of braille information.
3. Editing capabilities allows entering corrections without rewriting the entire page; this cuts down transcribing time.
4. Excellent quality braille for reading.
5. Reduced storage space eliminates bulk problem of paper braille. One C-60 cassette stores the equivalent of 400 pages of paper braille.
6. The VersaBraille is lightweight and portable.
7. The cost of producing books in tapeform is significantly less.
8. Since braille and audio can be recorded on the same tape, the need for transporting a tape recorder is eliminated.
9. Can be interfaced with other computer systems.

DISADVANTAGES

1. High cost of the devices.
2. Braille on tapes is not compatible among the different brands of paperless devices.
3. The machines do not allow for presentation of maps, charts, and diagrams.
4. Short line format prevents intelligible presentation of tabular materials (Nemeth Code).
5. Shorter line length should result in reduced rate of reading since more time will be spent moving the reading hands back to the beginning of the line.
6. Since these are complex machines maintenance problems still need to be defined.



400 Paper Pages
of Braille



400 Pages Paperless
Braille

Figure 13

Factors to be considered:

- (1) Read braille exclusively and are not able to read any type of large print.
- (2) High degree of tactile sensitivity.
- (3) High motivation to improve braille skills.
- (4) The student should be mature enough to understand and follow basic maintenance procedures of the VersaBraille System.

This screening is designed to gather information to determine if the student would profit from the instruction with VersaBraille system. It is believed that many of the indicators of success are common to most academic endeavors and much of the information that would be helpful in predicting success is already available.

VERSABRAILLE
SCREENING

Student Name _____

School _____

Grade _____

Pathology _____

Prognosis _____

Date of Birth _____

Visual Acuity

O.D. _____ O.S. _____ O.U. _____

Ability of student to read other mediums _____

Describe ability of student to read other medium (large print, regular print with use of C.C.T.V. or other optical aid, Optacon etc.)

Prerequisite Abilities and Skills: Information regarding these characteristics is probably available through previously administered psycho-educational assessment. Test of cognitive ability, academic achievement, developmental scales for younger students, and teacher observation should all be considered. Specialized instruments that may provide information include: Tactile Test of Basic Concepts, Hill's Performance Test of Selected Spatial Concepts, Roughness Discrimination Test.

1. Cognitive Ability _____

2. Language Ability_____

3. Maturity and Attentiveness_____

4. Long and Short Term Memory_____

5. Spatial and Positional Concepts_____

6. Manipulative Skills_____

7. Tactile Discrimination_____

8. Academic Achievement_____

Item nine provides objective information on tactile discrimination skills necessary for braille reading. Comments would include the student's performance, and difficulties noted as the discrimination becomes finer, or any difference noted in the performance of the student with paper braille as opposed to the VersaBraille.

9. Pre-Braille reader skills - Given ten lines of paper braille, student will correctly identify 3 stimulus braille characters from 7 distractors per line with greater than 85% accuracy. Discrimination becomes finer proceeding from line 1 to 10.

Comments: _____

10. Experienced Braille Reader The student's present efficiency in braille reading is an important factor when considering a student for training with the VersaBraille.

Braille Reading Skills (minimum 3 samples)

Reading rate (words per minute and comprehension indicated on the assessment should represent results from at least three trials. The material should be just below the student's present reading level.

rate (wpm) _____ comprehension (of errors/trials) _____

reading level assessed _____ reading level of test _____

Describe Braille Reading Techniques, one hand or two hands _____

Comments regarding selected mechanics can assist in the analysis of rate and comprehension figures. (pressure, scrubbing, line changes, etc.)

1. I/O Connector socket: rectangular metal socket with metal pins in center (allows attachment for teacher visual display)
2. External microphone and earphone: just below connector socket
3. On/Off switch: rocker switch, left side, back panel
4. Battery charger outlet: just below on/off switch
5. Tape deck: top surface, on the left side
6. Braille control keys: right front top of machine (analogous to Perkins Brailier but positioned as on a typewriter not between dots 1 and 4 as on Perkins)
7. Space bar: right front top of machine (analogous to Perkins Brailier but positioned as on a typewriter not between dots 1 and 4 as on a Perkins)
8. 20 tactile cell braille display: just above the braille keyboard
9. Text advance bar: along top edge braille display
10.  : Text back up key: horizontal long key, behind advance bar
11. Text access keys: four vertical key, behind the advance bar on raised shelf, just to right of back up key
 - 1111 = chapters
 - 111 = pages
 - 11 = paragraph
 - 1 = word
12.  : Place indicator: just above text access keys, small round key on left
13.  : Add new chapter: just above text access keys, small round key on right
14.  : Audio selection: on top right hand corner of machine, round key on left.
15. • • : Braille selection: on top right hand corner of machine round key on right, two raised dots beneath it
16. Internal speaker
17. Internal Microphone
18. Variable audio: left front top of machine
19. Variable volume: left front top of machine

20. Eject button: far left hand corner, on top beyond tape cover
21. Battery charger/AC adapter
22. Teacher Visual Display

VersaBraille™ Keyboard Description

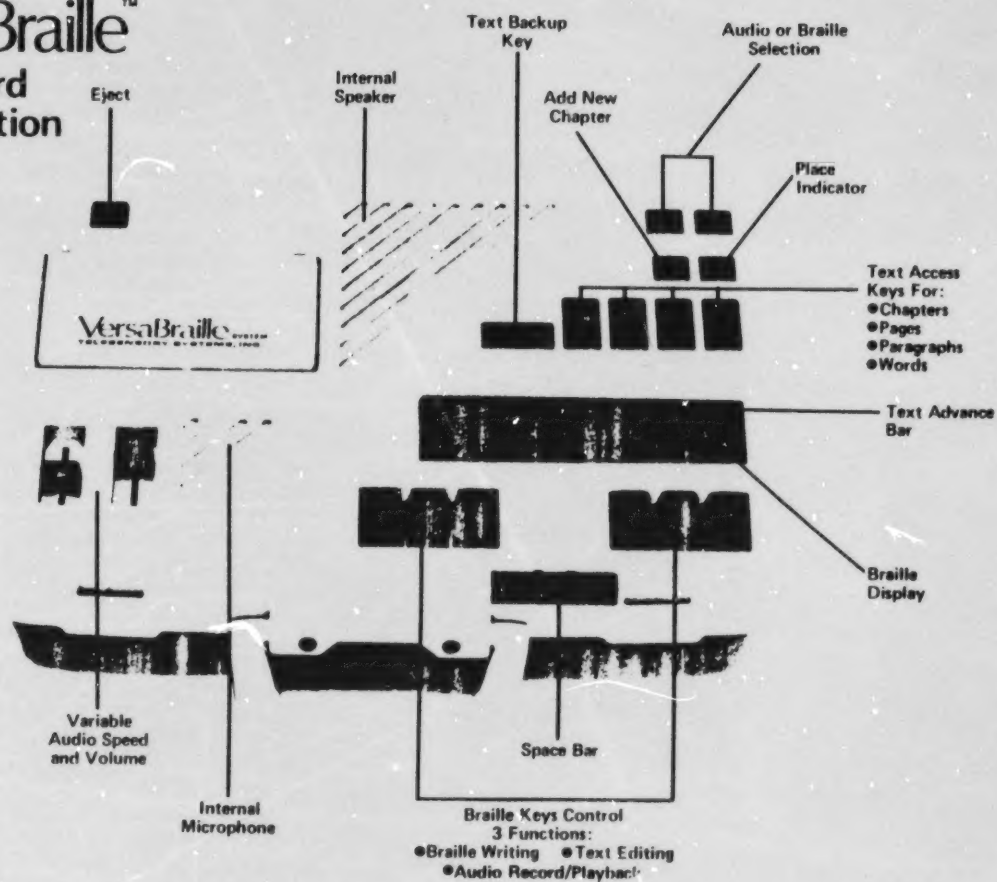


Figure 14 Keyboard Description

Photograph courtesy of
Telesensory System, Inc.

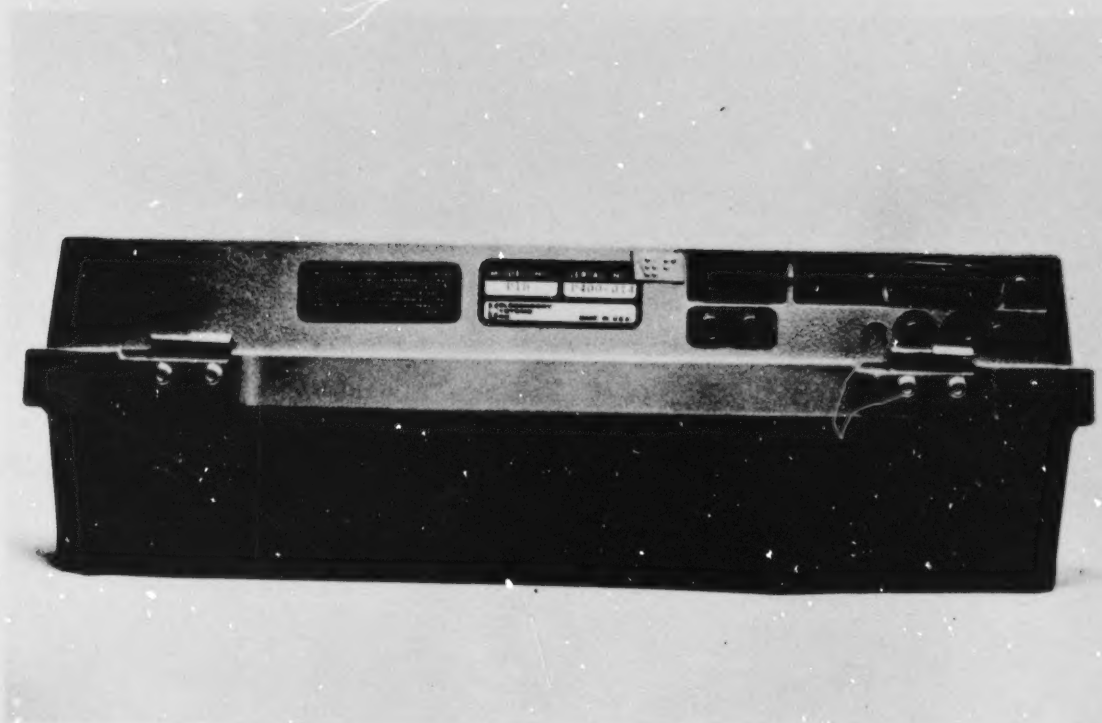


Figure 15 Rear View of VersaBraille

1. Plug battery charger into VersaBraille machine socket before plugging into wall outlet.
2. Plug rectangular connector socket from visual display into rectangular metal socket on back of machine.

The VersaBraille can be used when batteries are discharging. Batteries will not charge while VersaBraille is turned on. When VersaBraille is completely charged (14½ hours), the machine will operate 3½ hours of braille use or 2 hours audio independently without charge.

3. Always turn the power on after making electrical connections. Turn the power off before disconnecting plug.
4. Turn the VersaBraille on by pressing the on/off rocker switch located on left side of back panel.
5. After machine is turned on, the tape cover will automatically open and the braille line will display "ready."
6. Insert cassette tape into tape deck: *Note: High quality Maxell-UDX-1 C-60 tapes are recommended.
7. Close tape deck door. The braille line will display "select aud, brl, for."

A new tape must be formatted. If a tape has been previously formatted, either the braille or auditory mode will be selected.

*Formatting is the dividing of tape into pages. The VersaBraille does it automatically by putting electronic signals on tape, dividing it into 200 pages. Although the machine may format up to 225 pages on a tape, only the first 200 can be used. The page size sections contain space for 1,000 braille cells.

8. Begin the formatting process by chording (pressing of keys and space bar and then releasing at the same time).
9. While the tape is being formatted, the braille line will display "page." followed by three digits. The numbers will change to count the pages as they are marked on tape.

*The machine takes 15 minutes to prepare one side of the cassette.

*Formatting will erase any material previously recorded.

*During formatting, the visual display will indicate more than 200 pages are available. However, you are limited to 200 usable pages.

*While the tape is marking pages, all of the controls except the eject key are inoperative.

1. Once the tape is formatted, tape will rewind and cassette door will open. The braille display and teacher visual display will read, "ready."
2. Slide formatted tape back into tape deck and close cover. Display will read, "select aud, brl, for."
3. Press the braille selection key (small round key in the upper right hand corner of machine with two raised dots beneath it).
4. The braille line will display the word "name" at the beginning of line and "r b j j" at the end. The "r b j j" is the record of braille pages available. "b j j" = 200. (Note: the number sign is omitted.)
5. When "name" and "r 200" appear on braille display, the unit is ready to accept a new entry into the table of contents.

CHAPTER TITLES

6. Using braille keyboard, write a chapter title no longer than 10 braille cells. If a mistake is made in the table of contents, tap "new chapter key" and the braille line will display "name" again.
7. After you have written chapter title, tap the advance bar. Braille line will display a full braille cell, (the cursor). You are now able to write on the first page of the chapter.
8. Unit is ready to accept braille.

*The full braille cell is the system's writing symbol or "cursor." The cursor must be on in order to write on any page. It will NEVER be shown when writing titles in the table of contents.

WRITING PAGES

9. Use braille keyboard to write as if you would on a mechanical brailier.

*You can write, without interruption, a 1,000 braille cell page.
10. After writing several sentences on the page; turn off the cursor by chording space bar and dot 5.

RELOCATING TOP OF PAGE

The system can relocate the top of any page.

- press back up key repeatedly until you hear high pitch or
- chord dots 3 and 6 and the space bar (this will automatically return you to the top of the page).

WRITING ADDITIONAL PAGES

One can write any number of additional pages.

- turn cursor back on (chording space bar and dot 5)
- press "page" key and tap advance bar.
- tape will spin while machine stores previous page, (braille line will display "busy"). At this point, the machine has stored the number of braille characters on preceding page.
- when tape stops, braille line will be blank except for cursor sign.
- any number of pages can be written in a chapter up to a maximum of 200.

RESERVING PAGES FOR LATER USE

Blank pages may be reserved in a chapter by turning on the cursor, pressing "page" key and then advancing bar for each page to be reserved.

WRITING NEW CHAPTERS

- press "new chapter" key (small round key with raised rectangular symbol underneath it). Braille line will display "name" and number of pages remaining on tape. (Cursor will not appear in the table of contents.)
- tap advance bar. Unit will go to first page of new chapter.

BASIC READING

Insert tape, close cover, press braille selection key. While tape spins, braille will display "busy." When machine stops, braille line will display first title in table of contents.

Beginning of line will display title of first chapter.
The end of line will display a series of characters. The "u" means "used" and the number that follows is the number of pages written in that chapter. The second part of that code indicates number of pages available, "r" means remaining pages available within that chapter.

*Note: The pages in each chapter begin with page 1.

After braille selection key is pressed, the unit always locates the beginning of the table of contents. You must always return to the table of contents in order to read another chapter.

Tap the advance bar.

While the tapes spins, braille line will display "busy." When machine stops it will be on the first page of the chapter.

One can read through the page by tapping the advance bar after reading each line.

If the machine makes a low beeping sound, there is no more text space left in that page.

If the machine beeps after a page advance is attempted, there are no more pages left in the chapter.

READING CHAPTER TITLES

VersaBraille always locates the beginning of the table of contents after braille selection key is pressed.

- press chapter key
- tap advance bar
- braille line will instantly show next chapter title

READING PAGES

- locate title of chapter in table of contents
- tap advance bar
- machine will display first line of text
- read through page by tapping advance bar after reading each line
- *The unit will not automatically turn the page.

TURNING THE PAGE

- press page key
- tap advance bar

RANDOM CHAPTER LOCATION

Any chapter can be located in table of contents

- press chapter key
- write exact title
- tap advance bar
- the braille line will display chapter title selected

RANDOM PAGE LOCATION

Any page can be located within a chapter.

- locate title in table of contents
- braille number of desired page, (do not use number sign)
- tap advance bar
- braille line will display beginning text of page selected

*Note: If a page not located in the chapter is brailled, the VersaBraille will beep.

RANDOM WORD LOCATION

The system can scan within a braille page to automatically locate any word on the page.

- locate page
- choose any word written on that page
- press word key
- write word on keyboard
- tap advance bar
- display will show place on page where word occurs

*VersaBraille system does not require an entire word to be written. By writing part of the word, the unit will locate any word containing that string of characters.

PARAGRAPH SYMBOL

The VersaBraille system does not show paragraphs by changing lines and indenting two cells. The VersaBraille's symbol for starting a new paragraph is space (ed)p space (four characters). The paragraph symbol can be made by chording space key and dot 4.

You can skim through the text a paragraph at a time by pressing the "paragraph" key and tapping the advance bar. It will display the first line of the next paragraph beginning with: 

PLACE INDICATOR KEY

The small round key to the right of the new chapter key is the place indicator and is identified by a  shape tactile symbol. The place indicator will show how many characters have been used above the line you are currently on in the page. You must go completely to the bottom of the page and have the machine beep to find how many characters on the page have been used.

The VersaBraille editing system allows braille to be corrected, erased, or added to without disrupting text.

All editing functions require chording braille keys with the space bar.

The editing of any braille requires the use of the cursor.
DO NOT space across the line using only the space key.
This will erase all material written.

Dot 1: cursor right

Dot 2: cursor left

Dot 3: delete

Dot 4: new paragraph

Dot 5: cursor on/off

Dot 6: insert

Dot 1 and 4: change chapter title

Dot 3 and 6: return to the top of the page

SINGLE CELL ERRORS

Correcting Single Cell Errors

- turn on cursor
- move cursor to the right, chord dot 1 and space key.
- move cursor so it is over the incorrect character
- write correct character on key board
- turn off cursor
- the error has been corrected

Braille material can be removed from text without leaving empty spaces. The VersaBraille system can delete single characters, whole words, portions or entire paragraphs, pages or chapters.

DELETING WORDS

Any word can be deleted. The way to delete a word is:

- turn cursor on
- move cursor onto any character of word
- press word key
- press delete chord (space bar and dot 3)
- turn off cursor
- the word has been deleted

DELETING PARAGRAPHS

Any paragraph can be deleted. The way to delete a paragraph is:

- turn cursor on
- place cursor on the first cell of paragraph symbol
- press paragraph key
- press delete chord
- turn off cursor
- all braille material will be erased up to the next paragraph symbol
- *to delete part of a paragraph, position cursor at beginning of place to begin erasing
- follow same procedures starting with pressing of paragraph key.

DELETING PAGES

Any portion of page can be deleted. The way to delete a whole page is:

- turn on cursor
- place cursor at beginning of page
- press page key
- press delete chord
- page will disappear

DELETING CHAPTERS

Chapters can be deleted by erasing title from table of contents.

- locate chapter title in table of contents

- press chapter key

- press delete chord

*Remember cursor is not used as it never appears in table of contents.

INSERTING BRAILLE MATERIAL

One can insert braille material without disturbing original text.

- locate word which needs an extra letter

- turn on cursor

- move cursor to place where new braille character will be placed (i.e., insert "o: into "bat," place cursor over "a")

- chord space bar with dot 6 (this is insert chord)

- write new character to be inserted

- turn off cursor

- new letter will be in place

*To insert more than one character, follow same procedures. New material may be added until the page has reached its 1,000 cell limit.

CHANGING CHAPTER TITLES

To change chapter titles:

- locate title of any chapter in table of contents

- chord space bar with dots 1 and 4 (Note: This is a multiple key chord.)

- braille line will read "new name"

- write in new title (10 cells or less)

- tap advance bar

- braille line will display the new title name

INDEXED AUDIO

It is possible to write braille and record information on the same cassette. The audio is recorded on the second track of the cassette.

- press new chapter key (raised rectangle)
- braille line will display "name"
- when writing title, indicate audio by writing dot 3 before writing chapter title
- tap advance bar
- braille line will display "stop" and "count" followed by 3 digits
- *The VersaBraille will now function like a tape recorder

AUDIO RECORDING KEY FUNCTION

- Dot 1-fast forward, double arrow pointing to right
- Dot 2-fast rewind, double arrow point to left
- Dot 3-record, a solid circle (when pressed with 4)
- Dot 4-play, an open circle
- Dot 5-stop, an X
- Dot 6-counter reset, a circle with 2 horizontal lines through left and right sides

These are analogous to the symbols on APH recorders

INDEXED AUDIO PLAYBACK

To locate a particular audio recording:

- press audio selection key (Braille line will display the title of the chapter just recorded.)
- tape advance bar (system will locate the beginning of the audio recording, braille line will display the word "stop")
- to play back this chapter, press and release dot 4. (The braille line will change to display "play".)
- speed and volume controls are located on the lower left corner of the top surface of the machine
- to stop, press dot 5

To eject the tape:

- tap eject button lightly

- new material will be stored on the tape

- the tape will rewind and then be ejected

- *if held down for 6 seconds, tape will be ejected immediately. (This should be done only in emergencies.)

The teacher may elect to use the goal statements in the following skills checklist. This will assist in writing annual goals and accompanying short term objectives. These tasks have been broken down in the following manner:

1. describing basic functions
2. transcribing material using VersaBraille
3. editing functions
4. reading with VersaBraille
5. searching for selected materials
6. using audio mode
7. demonstrating care procedures for VersaBraille

Sample goals and short term instructional objectives are included. The teacher decides when the various tasks would be presented, breaks down the task into more discrete steps, decides upon criteria of mastery and anticipated dates of mastery; all based on individual needs of the student.

The screening section page will describe the student's present level of performance. The skills checklist will identify specific areas of instruction.

Prior to exposing the student to the VersaBraille system, it is necessary that the teacher be familiar with the operation, maintenance and various functions of the system. The following outline presents information contained in the manual that is available from Telesensory Systems, Inc., but arranged in a different order. The suggested sequence has evolved with preliminary efforts in mind. Equally important is the teacher's attitude towards the system. While the system is relatively new, there are blind individuals using the system interfaced with present computer technology thus making those individuals more independent, more efficient, and more employable.

- I. The student will describe the basic functions of the VersaBraille system.

_____ Braille mode.

_____ Auditory mode

- II. The student will be able to transcribe appropriate material onto a cassette using all of the writing functions of the VersaBraille system.

_____ Describe the cassette tapes which may be used with the system.

_____ Correctly prepare the system for use.

_____ Insert cassette.

_____ Identify braille writing keys.

_____ Format cassette.

_____ Identify braille selection key.

_____ Write chapter title and explain the organization of the tape into chapter, pages, paragraphs, and words.

_____ Identify advance bar.

_____ Identify cursor and explain concept of a Versa-Braille chord.

_____ Turn cursor on and off.

_____ Write text.

_____ Identify and explain the use of the new paragraph symbol.

- _____ Turn the page.
 - _____ Reserve pages for later use.
 - _____ Write new chapter titles.
 - _____ Identify and explain the use of the place indicator key.
 - _____ Rewind and eject tape to record material and explain reason for not turning off VersaBraille until the tape is rewound.
- III. The student will be able to demonstrate all editing functions of the system.
- _____ Identify and locate all editing chords.
 - _____ Locate and delete incorrect letters, words, paragraphs, pages or chapter.
 - _____ Move cursor forward or backward.
 - _____ Locate position and insert correct deleted letter, words, paragraphs, and chapter titles.
- IV. The student will be able to read appropriate material on cassette braille.
- _____ Insert cassette.
 - _____ Select braille mode.
 - _____ Read chapter titles, number of pages used, and number of pages remaining.
 - _____ Explain the separation of the chapter titles from the text.
 - _____ Advance to the text.
 - _____ Read with a smooth left to right motion, tapping the advance bar at the end of each line.
 - _____ Identify and explain the use of the back up key.
 - _____ Identify the new paragraph symbol in the text.
 - _____ After reading an entire page, advance to the next page.
 - _____ After reading a chapter, advance to a new chapter.

V. Student will be able to search for selected material.

- ☐ Move forward or backward through chapter titles to search for specified title.
- ☐ Search for a selected chapter title by writing in the exact title.
- ☐ Locate a specified page, by number, within a chapter.
- ☐ Locate a word on a page. (only 10 characters search)
- ☐ Locate the next occurrence of that same word.
- ☐ Skim by locating succeeding paragraphs.

VI. The student will be able to use the audio mode of the VersaBraille.

- ☐ Explain the relationship between braille and audio material on the same cassette.
- ☐ Indicate which chapters in the table of contents are braille and which are audio.
- ☐ Identify the six audio controls.
- ☐ Select and listen to audio chapter.
- ☐ Write chapter title for audio chapter and record an audio chapter.

VII. The student will explain and demonstrate care procedures for the VersaBraille system.

- ☐ Explain the sequence of operation necessary before turning VersaBraille unit on.
- ☐ Explain the use of the VersaBraille battery charger, time required for full charge, duration of direct current operation.
- ☐ Explain cleaning procedures. (Head cleaning)
- ☐ Explain cautions regarding moisture and temperature.

SAMPLE
INDIVIDUALIZED EDUCATION PROGRAM

Page 2 of 3

Student Name: Steven Wonder

Date: 10 /15 / 82

Area in which special education will be provided: Use of Versabraille

Subject Area(s): Braille reading

Present level of performance: Student reads paper braille at a rate of 80 wpm. With the Versa-Braille, student is currently 20 wpm with adequate comprehension.

Annual Goal: Student will read at a minimum of 80 wpm with good comprehension with the VersaBraille.

Instructor(s): (1) Teacher of Visually Impaired

(3)

SHORT TERM INSTRUCTIONAL OBJECTIVES	EVALUATION OF SHORT TERM INSTRUCTIONAL OBJECTIVES		
	Criterion for Mastery	Eval.Procedures, Eval.Schedule	Results/Date
1. With the VersaBraille the student will be able to read	30 wpm with 90% comprehension on 3 consecutive sessions	teacher evaluation 11/15/82	
2. With the VersaBraille the student will be able to read	40 wpm with 90% comprehension on 3 consecutive sessions.	teacher evaluation 2/15/83	
3. With the VersaBraille the student will be able to read	60 wpm with 90% comprehension on 3 consecutive sessions.	teacher evaluation 4/15/83	
4. With the VersaBraille the student will be able to read	80 wpm with 90% comprehension on 3 consecutive sessions.	teacher evaluation 6/10/83	

UNIQUE Methods: Individual instruction, VersaBraille
and/or Materials: _____

Comments: _____

1. The VersaBraille system is not as complicated as it looks.
2. Eject tape before turning off power.
3. Stop brailleing as soon as possible after first "pip" sound (cell 950).
4. Bulk quantities (over 100 tapes) of C-60 Maxcell tapes can be purchased from:

Mr. Vito Proscia
 Innovative Rehabilitation
 Technology, Inc.
 375 Distell Circle Suite A-11
 Los Altos, CA 94022
 (415) 965-8102

5. It is possible to write braille and record audio on the same cassette. The audio is recorded on the second track of the cassette.

		(For more braille) Sides of Tapes Available
Braille Recorded/One Side	Audio Recorded/One Side	
Yes	No	One More
Yes	Yes	None
No	Yes	One

6. Cassettes are reusable; simply reformat tape.
7. It is important to remember to turn machine off when not in use, there is no signal (light, sound, etc.) or automatic turn off switch.
8. The teacher should label all tape cassettes as soon as information is placed on cassette to make identification quick. Labeling can be done by ink or braille markings, or labels that come with cassettes.
9. The electronic keyboard has been designed to be used with a light touch. The student may actually damage the keyboard if they apply too much writing force, as the keys work on the upstroke.
10. Before turning the rocker switch "on," the student should make sure that both VersaBraille machine and visual display are plugged into wall outlet.
11. Before unplugging the VersaBraille, the student should turn off both the visual display and the VersaBraille machine.

12. During the formatting process if machine is accidentally turned off or the eject key is pushed, the electronic page marking process will need to be started completely over.
13. It is IMPORTANT to never turn the VersaBraille off without rewinding the tape. If the machine is turned off before rewinding, the last chapter entered in the table of contents and the last page of the written text may be lost.
14. If the student does a word search for a word that does not appear on the page, the VersaBraille will give a low "beep."
15. In the initial stages of reading instruction, the student could be given cassette pages with errors (e.g. words with ext a letters to correct).
15. The teacher should retain all VersaBraille packaging material and shipping carton in case the unit needs to be returned to TSI for repair.
16. The teacher should present a variety of instructional material to student using the VersaBraille. (Quizzes, worksheets, creative writing assignments, etc.)
17. Be careful not to have any liquid (coffee, soda, etc.) on or near machine.
18. If moisture gets in unit, it can destroy the electronics. In case of spill or moisture, turn machine off immediately and check for moisture. If you are not sure machine is dry, contact a TSI service representative #800-227-8418.
19. Machine should not be used in room temperatures above 95°.
20. Serious damage can result if charger is plugged into or disconnected from the unit while the charger is plugged into the wall. ALWAYS plug charger into VersaBraille before charger is plugged into the wall.

VERSABRAILLE APPLICATIONS

1. To draft letters and reports for inkprint versions. (P-1 and P-2)
2. Telephone and address directory.
3. General notetaking.
4. To keep a calendar.
5. To prepare for reports.
6. To write and reread music.
7. Keeping files.
8. Recipes.
9. Games (jokes, question/answer, etc.)
10. Textbooks and school worksheets.

COMPUTER WITH INTERFACE

1. Prepare materials for braille transcribing. (P-2)
2. With minicomputer to learn computer techniques and programming.
3. With printer for producing inkprint reports and personal letters.
4. Deaf-blind individuals can use P-2 VersaBraille to communicate by telephone with others who have home computers.

CONSUMER INFORMATION CHART

	U.S.A. TSI (VersaBraille)	GERMANY PAPENMEIR (Braillex)	FRANCE TRI FORMATION (MB-2400)
Tactile display length	20 brl. characters	32 brl. characters	24 brl. characters
Cell size	6 dot	8 dot	6 dot
Storage medium	cassette	cassette-C floppy disk-D	cassette
Cassettes coupled via	duplication	regeneration for cassette version	regeneration
Data organization	Book format (chapters, pages, etc.)	Data Stream with key words designated	Data Stream
	VersaBraille P-1, P-2	Braillex Notex	Microbrailleur MB-2400
	Information storage retrieval	Information storage retrieval	Information storage retrieval
Data indexible	yes	yes	yes
RS 232 portable	P-2	no	Two built-in interfaces
Automatic retrieval of original data	yes	yes	yes
Character capacity	400 pages (C-60)		550 pages (C-90)
Visual display (Optional)	yes	yes	yes
Weight	10 lbs.	30.6 lbs.	6 lbs.
Transport	electronic	electronic	electronic
Battery charger	external accessory	not available	self-contained battery charger
Sophisticated editing	yes		yes
Cost as of June 1982	P-2 \$6,950 P-1 \$6,250 Teacher Display \$1,150	not available	\$4,850

MAINTENANCE

1. Use head cleaner tape included with the VersaBraille system approximately once a week.
2. To remove dirt on chassis use cloth dampened with a mild detergent. DO NOT apply any liquid directly on the case or any part of the unit.
3. The visual display can be cleaned with a cloth dampened with a mild detergent. It is important not to use any abrasive cleaner.
4. Keep cassettes away from magnetic fields.
5. Keep cassettes out of direct sunlight. (Leaving in car on hot days or stored in trunk can destroy cassette.)
6. Periodically (every 6 months), let VersaBraille batteries completely run down.
7. When VersaBraille is fully charged for 14 hours, VersaBraille will operate for 3½ hours of braille use or 2 hours of audio use.

Both the P-1 and P-2 VersaBraille systems have a one year warranty. This warranty covers the following:

1. Defective parts and/or workmanship.

*Note: Authorization must be obtained for TSI Service Department before a unit can be sent for warranty service. Shipping to and from the service center is included.

A one year warranty extension of service agreement can be obtained at the time of purchase (P-1 \$648.00) and (P-2 \$680.00).

Service agreements purchased at the end of the warranty period are:

P-1 \$810.00 per year

P-2 \$850.00 per year

Visual Display \$100.00 per year

Telesensory Systems, Inc.
3408 Hillview Avenue
Palo Alto, California 94304

(415) 493-2626
(800) 227-8418

QUESTIONNAIRE RESPONSES

The following is a summary of the responses received on a questionnaire sent to teachers of the visually impaired in the state of Florida. Of the 107 questionnaires sent, 46 responded.

Do you teach students the use of the VersaBraille?

Yes: 0 No: 44

What factors determine which students will use the VersaBraille?

I am unfamiliar with VersaBraille presently, but will be attending a workshop in Atlanta for experienced Optacon teachers where I will have a demonstration of it.

Unless this is another name for something I do teach or am aware of, I admit ignorance on "versabraille."

I don't know.

Would like more info, cost, etc.

I don't have one. 2

The following is a summary of the responses received on a questionnaire sent to residential schools for the visually impaired in the United States. Of the 49 questionnaires sent, 31 responded.

Do you teach students the use of the VersaBraille?

Yes: 0 No: 29

What factors determine which students will use the VersaBraille?

*Good braille users. Need for additional materials not currently available in braille.

*Academic level.

This questionnaire was sent to thirty university training programs for teachers of the visually impaired. Eleven have replied. The following is a summary of their responses.

Do you have a VersaBraille system? Yes: 3 No: 8

Any comments about the VersaBraille?

"Very exciting. We would like to have one. The P-2 is working well in our microcomputer systems and seems preferable to the Digicassette. Great potential use for teaching braille."

SUMMARY OF RESPONSES
QUESTIONNAIRES SENT
TO FLORIDA VISION
TEACHERS

January 1981

SUMMARY OF RESPONSES
QUESTIONNAIRES SENT
TO RESIDENTIAL
SCHOOLS

January 1981

SUMMARY OF RESPONSES
QUESTIONNAIRES SENT
TO UNIVERSITY
TRAINING PROGRAMS

January 1981

1. On a page of paperless braille, there can be a maximum of ____ braille cells per page.
 - ☐ a. 200
 - ☐ b. 950
 - ☒ c. 1000
 - ☐ d. none of the above
2. On a C-60 cassette tape, there are ____ pages on one side of a cassette.
 - ☒ a. 200
 - ☐ b. 950
 - ☐ c. 1000
 - ☐ d. none of the above
3. There can be a maximum of ____ chapter titles on one side of a cassette.
 - ☒ a. 10
 - ☐ b. 50
 - ☐ c. 200
 - ☐ d. none of the above
4. If you are using both the braille and audio on a single tape, how many sides of the tape are available?
 - ☒ a. two
 - ☐ b. one
 - ☐ c. zero
5. The following are other paperless braille machines.
 - ☒ a. Braillex
 - ☒ b. Digicassette
 - ☐ c. Xerox
6. The VersaBraille system is:
 - ☒ a. a paperless braille machine
 - ☒ b. a self-contained braille and audio information system
 - ☐ c. talking book machine
7. To begin a new chapter you:
 - ☐ a. press chapter key
 - ☒ b. tap advance bar
 - ☐ c. press new chapter key

8. The cursor will appear in the table of contents.

- ☒ a. True
☐ b. False

9. To return to the top of the page,

- ☒ a. chord dots 3 and 6 and the space key
☒ b. press the back up key repeatedly until you hear a high pitched "pip"
c. tap advance bar until you hear a high pitch

10. One can reserve a blank page in a chapter by:

- ☒ a. tapping the space key repeatedly
☐ b. turning on the cursor, pressing page key, and then advance bar for each page reserved
c. turn machine on quickly

C-60 cassette: standard cassette with one hour (60 minutes) recording time.

Chording: the pressing and releasing of the space bar and a braille key at the same time.

Cursor: a full braille cell, the VersaBraille system's writing symbol.

(ed) p: VersaBraille paragraph symbol. This is a symbol that has no meaning in the literary braille code.

Formatting: process in which electronic signals will be recorded on the tape, dividing it into page sized sections that each contain space for 1000 braille cells.

Place indicator key: small round key to the right of the new chapter key. This key will tell the user how much space on the page has already been used. It can be identified by a diamond shaped tactile symbol below the key. (see page 16)

Tactile Display: twenty cell braille display line located just behind the braille keyboard.

VersaBraille System: is a self-contained braille and audio information center emphasizing logical storage and easy retrieval of braille on a cassette tape.

Visual Display: provides a visual reproduction of the braille display. It is intended to be used for demonstration purposes for teaching, and for monitoring of transcription text.

Word: the VersaBraille systems defines a "word" as "any string of characters followed by a space."

Ashcroft, S.C. and M. Bourgeois Experiences with ELINFA's Digicassette in Research, Educational, and Employment Settings. Journal of Visual Impairment and Blindness, May 1981, 75 (5), 226-228.

This is a report on a telephone conversation between Ashcroft, principal investigator in the BEH funded Digicassette evaluation project, Michelle Bourgeois, research assistant, and other persons who were involved in the project or are Digicassette users. Bourgeois began the discussion by reviewing the Digicassette evaluation research completed in Ohio and Tennessee. The students used for evaluating the educational use of the Digicassette attended elementary through graduate degree programs. Reading and writing rates were discussed.

Following the review of the project, the future potential of the Digicassette for use in education and employment was discussed.

Bourgeois, M. and S.C. Ashcroft Paperless braille reading: A preliminary research report. Paper presented at the Annual International Convention, Council for Exceptional Children, Dallas, April 1979. (ERIC Document Reproduction Service No.ED 171-078)

This paper discusses the preliminary research findings from a BEH sponsored project entitled "Evaluation and Research Program for the Portable Braille Recorder (or Digi-cassette)." The primary purposes of the project were to research the potential use of the Digicassette in the education of the blind, studying factors which determine user satisfaction, and studying braille reading and writing performance. A description of the Digicassette and its functions is given. Design problems are discussed.

The preliminary findings deal mostly with the study of oral reading rates and oral reading rate errors for subjects using conventional braille material and brailled materials on the Digicassette. The data suggests the following:

- Digicassette reading is slower than conventional braille, but reading rate will increase over time and practice.
- Reading error rates were similar between the two modes which suggests that the problem of having broken words at the end of the 12 cell readout is not significant.

-Reasons for the comparable reading error rate are suggested.

Evensen, R. H. "Cassette Braille Technology." Facts: National Library Service for the Blind and Physically Handicapped, January 1980 - present.

This periodic fact sheet gives progress reports on the cassette-braille evaluation project sponsored by the National Library Service. The first sheet from January, 1980 describes the evaluation project and discusses the three devices under study: the Digicassette by Elinfa in France, Braillocord by AID Electronic in Germany, and VersaBraille by TSI in California.

For information on the project, contact: Richard H Evensen, Program Analyst, National Library Service for the Blind and Physically Handicapped, The Library of Congress, Washington, DC 20542.

Foulke, E. "Impact of Science and Technology on the Early Years." Journal of Visual Impairment and Blindness, March 1981, 75 (3), 101-108.

Reviews the contributions of technology towards the communication and the mobility needs of the severely visually impaired. The technology discussed includes paper braille and computer braille production, paperless braille, reading by listening and compressed speech, tangible graphic displays, and electronic travel aids. The importance of early experiences in the visually impaired child's life is emphasized. The potential use of technology can only be realized through thorough preparation of the person who will use the technology.

Mellor, CM. "Technical Innovations in Braille, Reading, Writing, and Production." Journal of Visual Impairment and Blindness, October 1979, 73 (8), 339-341.

The following electronic devices are described and discussed:

Tellatouch - manufactured by AFB for communicating with deaf-blind persons who know braille.

Digicassette - developed in France, this device converts

braille to a digital code that is recorded on a cassette tape; it is read back on a 12 cell "reading board." A single cassette can hold the equivalent of 300+ sheets of braille paper. This device can be interfaced with a calculator, computer, or an adapted typewriter.

Braillex - manufactured in Germany, this paperless braille device is much more complicated and expensive. The read out is 32 cells and can store the equivalent of 520 pages of braille. It has programming features to allow its use as a dictionary or filing system.

VersaBraille - manufactured by Telesensory Systems, Inc. (TSI), this paperless braille device has a microcomputer in the braille information processor which allows it to record with separate chapters and pages for simple organization. Words, phrases, or characters can be automatically located. Correcting and editing features are included. Braille read out is 20 cells.

Braille terminals - most widely known manufacturer is Triformations Systems, Inc., these terminals can provide a braille version of the input and output of some computer systems.

Braille production devices - for mass-producing braille.

The author summarizes by discussing the advantages and disadvantages of the new paperless braille systems. They are economical because they eliminate the need for paper and massive storage space. On the other hand, they are costly for the user, and not yet fully reliable due to the electro-mechanics of the devices.

Nolan, C.V. "Thoughts on the Future of Braille." Journal of Visual Impairment and Blindness. October 1979, 73 (8), 333-335.

Code changes, paperless braille, direct print reading systems (i.e. Optacon), mass production devices, and teaching materials are discussed. Future trends, advantages and disadvantages of each device are briefly described.

Sensory Aids Foundation. American Foundation for the Blind. Sensory Aids for Employment of Blind and Visually Impaired Persons: A Resource Guide. New York: American Foundation for the Blind, 1978.

Provides a listing of sensory aids for visually impaired persons. Each entry includes the following product information.

1. generic name for product
2. function of the device
3. employment applications
4. detailed description of the device
5. vendor name, address, and telephone number
6. availability
7. price, as of June 1978

Entries include: digicassette, electronic visual aids, "paperless" braille devices, variable.

REFERENCES

Ashcroft, S.C. and M. Burgeois. "Experiences with ELINFA'S Digicassette in Research, Educational, and Employment Setting." Journal of Visual Impairment and Blindness, May 1981, 75 (5), 226-228.

Bourgeois, M. and S.C. Ashcroft. Paperless braille reading: A preliminary research report. Paper presented at the Annual International Convention, Council for Exceptional Children, Dallas, April 1979. (ERIC Document Reproduction Service No. ED 171 078)

Evensen, R. H. "Cassette Braille Technology." Facts: National Library Service for the Blind and Physically Handicapped, January 1980 - present.

Foulke, E. "Impact of Science and Technology on the Early Years." Journal of Visual Impairment and Blindness, March 1981, 75 (3), 101-108.

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State of Florida
Department of Education
Tallahassee, Florida
Ralph D. Turlington, Commissioner
Affirmative action/equal opportunity employer

This public document was promulgated at an annual cost of \$5,136.63 or \$10.26 per copy to assist local school systems in developing programs for Visually Impaired Students.

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Adopted, State Board of Education, Jan. 20, 1981